School Shop

vol. XIV no. 3
NOVEMBER 1954

Planning and Finance in Vocational Education
by William B. Hawley

Cut-Away Engine That Runs
by Oliver B. Akers

Drawing Aid Helps Beginners
by Robert Houghton

Inlaid Coffee Table
by Fred Fogg

Cover story: In an auto-mechanics class at Hollywood High School, Los Angeles, young men display their "know-how" on the genuine article. On page 12 of this issue is the amazing design of a California teacher, a cut-away automobile engine that runs!

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

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Brief Facts

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Spindle Hole, 1⅜"

Swing over bed, 11⅛"

Center Distance, 24"

Bed Width, 6 15/16"

Ball Bearing Spindle

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School Shop

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

Vol. XIV, No. 3 **November 1954**

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Desegregation and Vocational Education

The Supreme Court decision of last May requiring the end of segregation in the schools of the nation has created problems of considerable magnitude for many of the southern states. Apparently various measures are going to be taken to comply with the decision or attempt to circumvent it, with some states anxious to try methods of continuing the customary segregation policy without waiting for the clarifying procedures on which the Supreme Court is holding hearings this fall.

The questions now to be taken up by the Supreme Court include such matters as whether the Court itself should formulate detailed decrees putting the ruling into effect, whether a special master should be appointed to hear evidence and recommend terms for such decrees, or whether the cases should be remanded to the courts where they originated for such action.

In the meantime some state legislatures have met and passed laws which take the state education system out of the nominal hands of the state and place them under quasi-private jurisdiction. In other states the governor has suggested that such a procedure be followed.

The effect of making public schools private institutions would certainly mean the end of federal support for vocational education in the states involved as well as the end of other federal subsidies such as the school-lunch program. Bulletin No. 1 of the U. S. Office of Education, Vocational Division, which gives the regulations under which federal aid is given to the states, is quite clear on the subject. It states:

> One guiding principle of the vocational education acts—and it cannot be too strongly emphasized that this principle applies to every phase of activity under these acts—is "that such education shall be given in schools or classes under public supervision or control."
>
> A school or class is considered to be under public supervision or control, within the requirements of the federal vocational education acts, when it meets all of the following criteria:
>
> 1. It is organized and operated under the direction of a state or local board responsible for expenditure of public-school funds for vocational education in the state or community.
>
> 2. The teachers are paid from public funds in the same way as other public-school teachers employed by the state or local board . . . are paid.
>
> 3. Officials on the staff of a state or local board responsible for vocational education have full charge of: (*a*) selection, salaries, and length of term of teachers; (*b*) qualifications and admission of the pupils; (*c*) content and organization of all courses and curricula.

Obviously if a state's public schools were turned over to a private agency in each community, as is seemingly contemplated in several states, they would no longer qualify for Smith-Hughes and George-Barden Act funds. This would mean a most serious curtailment of vocational education in the states affected.

About 25 percent of the cost of vocational education in several southern states is borne by the federal government. These states which are planning to make their public schools private are also the ones with the least taxing power to make up the loss of federal funds through local and state taxes. Several of them are already spending a higher percentage of their income on schools than many of the comparatively more wealthy northern states. It is difficult to see how they could possibly carry out their announced intention of turning over the public schools to private agencies without seriously curtailing the vocational-education program. This is particularly undesirable since the South's economic renaissance of recent years has been built on a higher level of skill in industrial and agricultural pursuits—a situation in which vocational education plays a vital part.

There seems to be no question but that some action will have to be taken by the southern states as a result of the Supreme Court decision. Whether such procedures as trying to make the public schools private is a desirable move in the face of the loss of millions of dollars of financial aid for one of the most important phases of education will have to be carefully weighed by the states involved.

No consideration has been given in the foregoing to the democratic implications of the desegregation decision. Many communities and states have already done much to implement the decision in an orderly and systematic way. The relatively few cases where difficulties have occurred have been given greater significance than the situations warrant because they are reported in the press while the orderly procedures have not been considered as newsworthy.—*L. W. P.*

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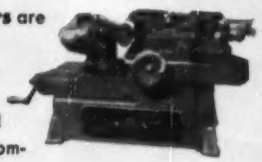

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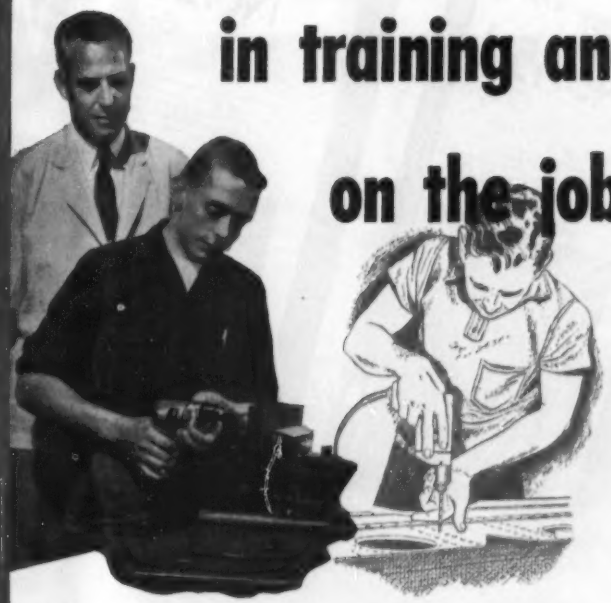

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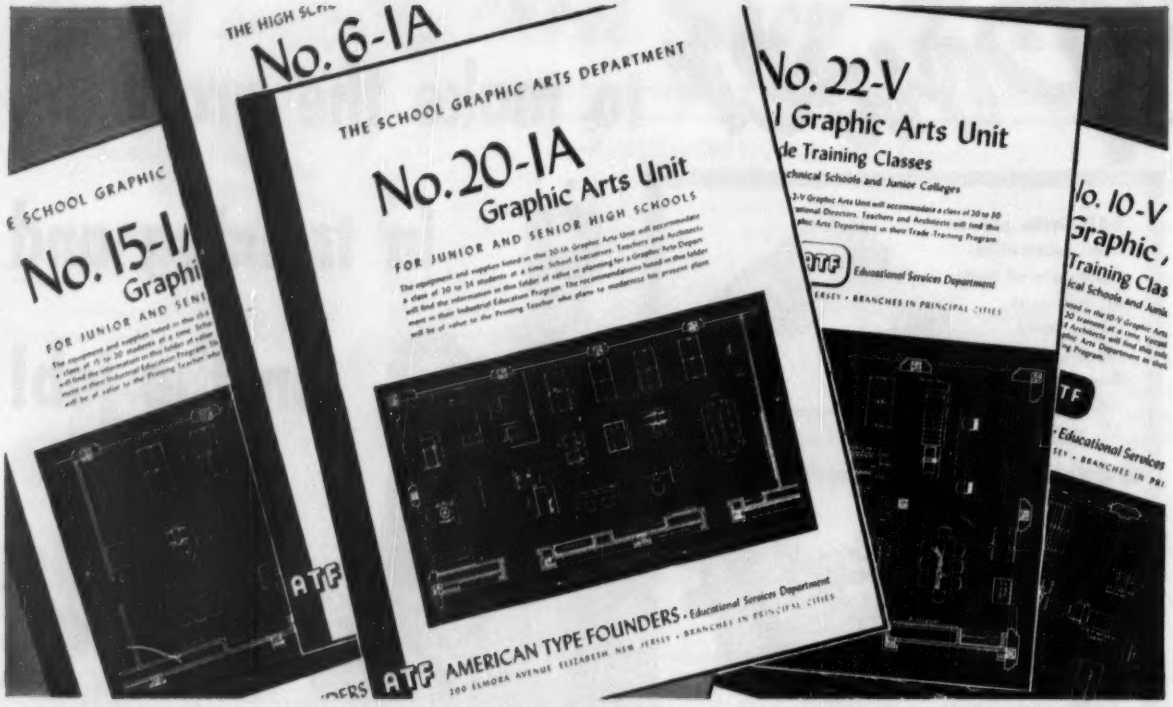
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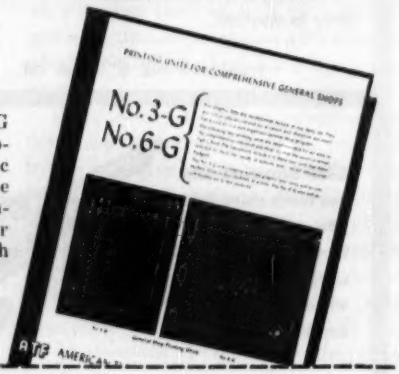

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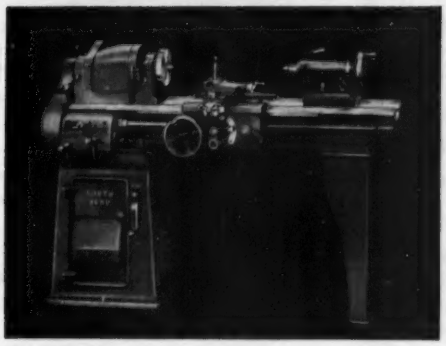

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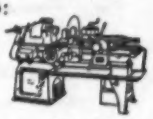

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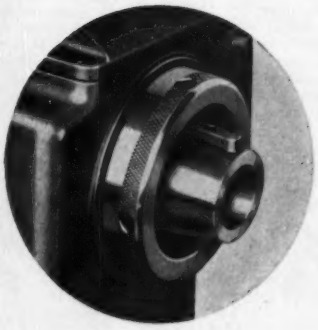

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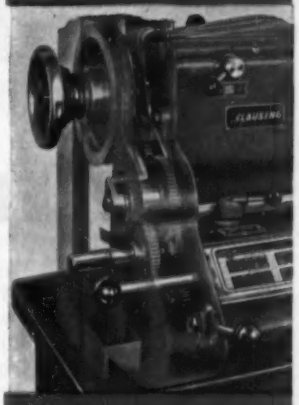

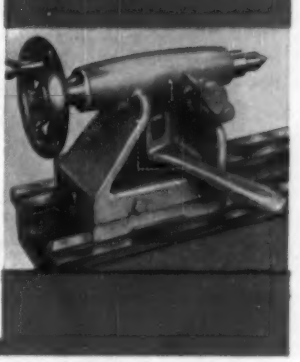

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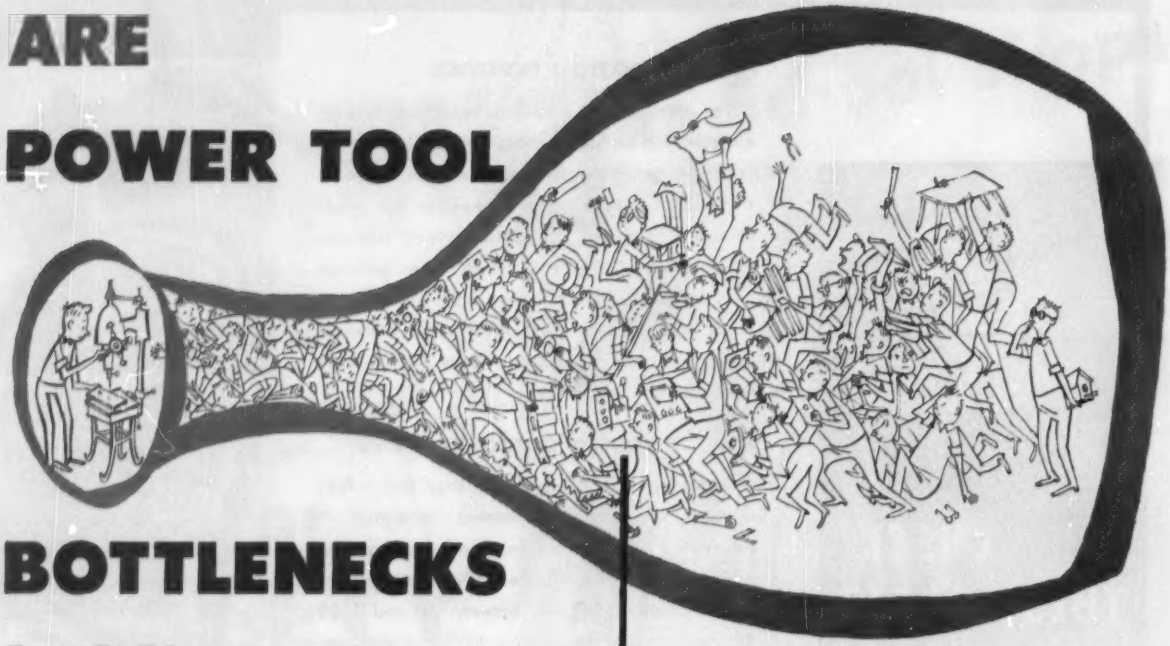

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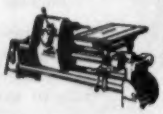

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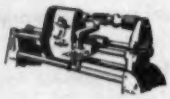

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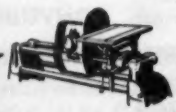

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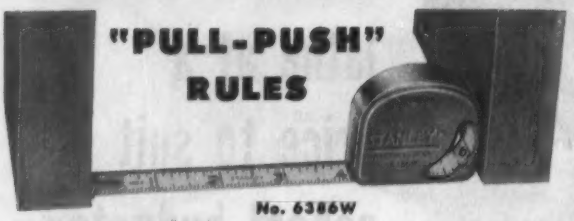

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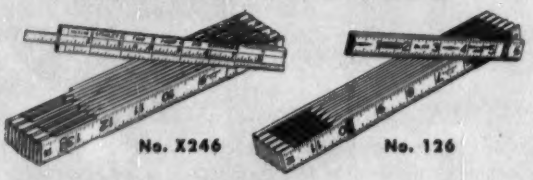

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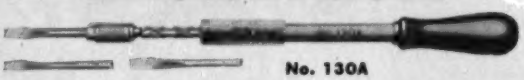

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An expert takes the stand on

Planning and Finance in Vocational Education

By William B. Hawley

Head, Department of Vocational Education, Michigan State College, East Lansing, Michigan

ONE of the typical characteristics in many situations in America is the gap between ideals and practices; the distance between what we profess to believe and what we do; the frequent variance between our precept and our example. Neither education in general nor vocational education in particular is free from this characteristic.

As educators, we believe in free and equal educational opportunities for everyone in America, at least through 12 grades of school; but we are a long way from practicing it, either within states or among states. As educators, we believe that every youth should be given the experiences that help him choose, prepare for entrance into, and progress in an occupation suited to his interests, strengths, and weaknesses; but we have a long way to go in achieving this ideal.

Leadership in education, including vocational education, is or should be directed toward a continual diminution of the wide space between educational ideals and educational practice, in planning, in operation, and in finance. This leads to considering the way in which "leadership" creates change — brings about more desirable practices.

For Mutual Understanding

In vocational education, we have—in the U. S. Office of Education, in many states, and in many local school districts —accepted the view that "leadership" or "supervision" in vocational education is largely a process of bringing to bear ideas, facts, and principles on a situation. The objective is to provide information and resources which will help the people concerned arrive at conclusions and agreement regarding their educational goals and practices. Thus, the U. S. Office of Education specialists in vocational education consult with state personnel in a climate designed to gain mutual understanding and agreement.

The result will (it is hoped) be improved procedure or programs springing from a firm belief that the action is "right" for that state. State vocational-education leaders, consultants, and supervisors work with local school personnel on the same basis. All of this (though it may be over-simplified here) is based on the belief that while superficial educational *change* can be created by administrative authorization, lasting educational *growth* can be achieved only through the conclusions, agreements, and actions of concerned people in the communities where educational action takes place.

This implies that lasting excellence in education can be achieved only to the extent that the people concerned in a given situation can, in a unified way, understand, believe in, take action toward, and acquire resources for an improved educational program.

If these things be true, then "imposed" goals or practices can at best give programs precarious existence, dependent on the continuation of the force or circumstances which "imposed" them, unless such goals and practices come to be believed in and accepted as a part of the total pattern of education at the "action" or community level.

The Fundamentals

These fundamental ideals or beliefs have some implications for planning and for promotion (financial and otherwise) of vocational education:

1. In this connection (planning), it is the role of the Vocational-Education Division of the U. S. Office of Education to supply, where needed, the inspiration, information, and consultant service which will be helpful to states in arriving at a plan for the development and improvement of vocational education within the state, on a broad base. This leadership should be characterized by freedom from didactic pressures and preconceived, rigidly outlined, program patterns. The resulting plans and directions should be ones which the concerned people in the *state* have concluded are best and realistic for that state. The excellence, breadth, unity, and level of accomplishment will vary greatly among states. But if effective, permanent educational growth can be achieved only to the extent that the locally concerned people can, within their own beliefs and agreements, achieve it, the variations are natural and a challenge to leadership.

2. Similarly, leadership within the state brings to local school districts the inspiration, information, and consultant service which will result in intelligent planning on the community level. The resulting action-plan will be the most favorable level for *them;* it will and should reflect the goals (and programs leading to the achievement of those goals) which the concerned people in that community have developed, believe in, and agreed on.

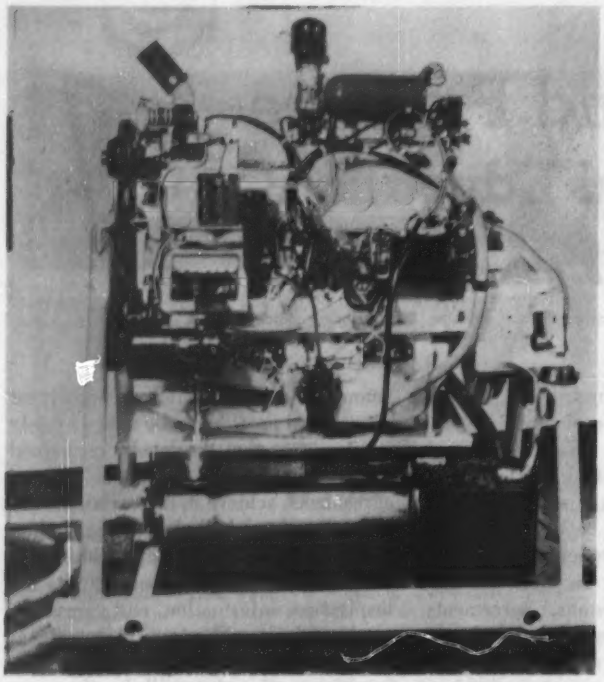
Communities Are Different

There will inevitably be variation among communities within the state; the variations will reflect both the differing social-economic-cultural complexes of the communities and the education growth level (from the vocational-education leader's point of view) of the community people involved.

Special financial aid at the federal level for the further development and maintenance of vocational education is, I believe, essential to the welfare of our nation. Security, technically competent labor force, mobility, concentrated taxing power, varying financial ability among states, and other reasons have been well described. The recent increase of $5,000,000 in federal aid to vocational education is an expression of the belief of our legislature in this principle. Any aid of this character in the long and objective look, and in the light of what we believe about educational opportunity, educational growth, and educational leadership, should provide financial help and encouragement which, among other things:

1. Recognizes the necessity for educational growth and educational patterns to emerge from those who are on the operating level;

(*Continued on page* 18)



The cut-away engine that runs, mounted on a castered stand and ready to be started. Note the opening cut into #1 and #2 cylinders. The thermostat and bypass system on the front of the head have been exposed. The generator has been lowered and remounted to allow for a window for the crankcase. Note relocation of oil-pressure gage and also of the ignition coil on side.

Students can really see what happens with this

Cut-Away Engine That Runs

By Oliver B. Akers

David Starr Jordan Junior High School, Burbank, California

EDITOR'S NOTE: Cut-away engines and components are an old story to teachers of auto mechanics but here is the first one we have ever seen which actually operates in a normal manner using gasoline as a fuel. An ingenious system of portholes, some covered with clear plastic and some not, plus an internal lighting system and the use of stroboscopic light, makes it possible for the observer to see an internal combustion engine in actual operation. We had the pleasure of watching this engine operate and it does exactly what the author claims for it. He developed this unique audio-visual device as a graduate-student project at Chico State College. A limited number of detailed construction directions and illustrations is available from the author for which a charge of $3 is made to cover the cost of reproduction.

ONE of the problems of teaching the internal combustion engine is that of communication between the instructor and the student. The basic principles and theory of the internal combustion engine are not difficult to understand but when put into practice they become hidden under many technicalities of application. For many years the armed forces, industry, and educational institutions have resorted to visual aids to assist the instructor in presenting the conditions that exist within the engine and engine accessories during operation. These visual aids are found in many forms but the most common type is the cut-away engine which, by removal of housings that conceal, allows the student to study the relationship of internal working parts.

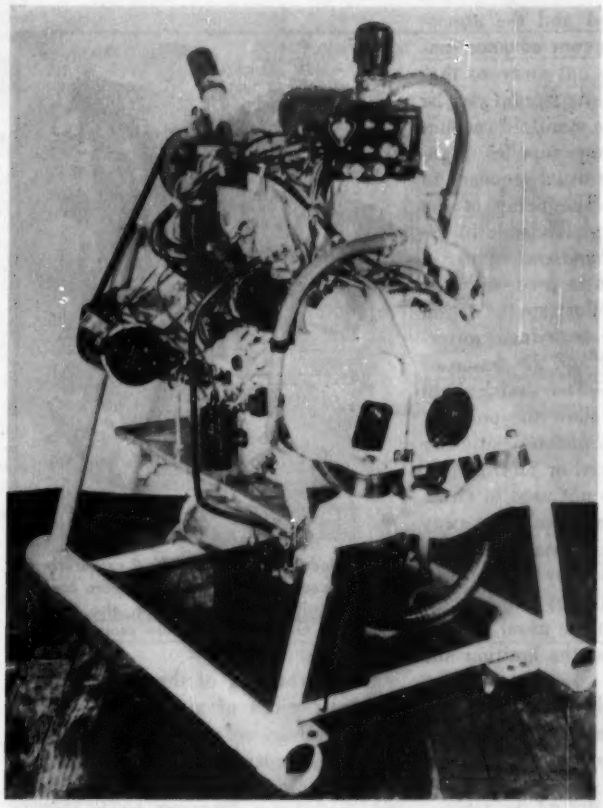
While this type of instructional aid has brought realism into the classroom it has two basic limitations. First, it is difficult for the student to visualize the velocity with which the reciprocating parts actually move. Second, it is impossible for the students to hear the sounds the engine would produce under different conditions of operation. To further the value of the cut-away type of instructional aid a new approach was made to the production of a cut-away engine for use in the conventional academic type classroom. A typical six-cylinder automobile engine was modified so that the rear three cylinders would produce power in the normal manner, using cut-away accessories to perform their normal functions. The front three cylinders and the engine block assembly were cut-away or modified so the normally hidden parts and systems could be seen while the engine was actually producing power.

The unit as constructed is selfcontained and consists of a six-cylinder Plymouth automobile engine mounted on a castered stand. It was designed to be easily handled in school corridors and will pass through the standard classroom door. The width is 30″, the length is 42″, and the over-all height is 49″. The unit was built without the use of machine-shop facilities; only hand tools and hand electric tools were used in its construction. No changes were made in the ignition or valve timing except that openings were provided in the engine and accessories for observation purposes. An internal and external six-volt lighting system, plus the painting of all areas in contrasting colors, make it easy to observe or trace the various systems or locate parts on or within the engine or accessories.

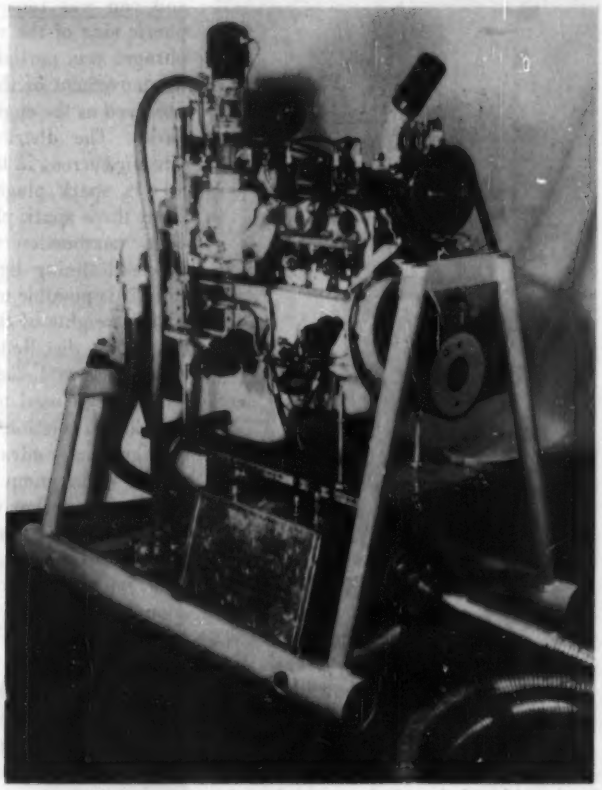
The engine was altered so that cylinders #4, #5, and #6 operate together as a true three-cylinder, four-cycle gasoline engine with a power impulse being produced every 240° of crankshaft rotation. This can be explained by noting the original firing order for the Plymouth which is 1-5-3-6-2-4. With the elimination of cylinders #1, #2, and #3 from that firing order a new power sequence of 5-6-4 was obtained without changes in valve or ignition timing.

To insure smooth operation with only three cylinders, the total flywheel weight was increased to 80 pounds by bolting two flywheels together. The three-cylinder engine starts in the usual manner and idles smoothly at 550 rpm. It accelerates normally and without vibration up to 2500 rpm. Higher engine speeds are feasible but have been avoided to prevent possible damage to the exposed pistons and rings.

The combustion chambers of #1, #2, and #3 cylinders are sectionalized to expose the action of the valves, pistons, and spark plugs. On the right side of the engine just above the generator, an opening about 45° of #1 and #2 cylinder walls was made to expose the piston and rings. The actual action of the piston rings can be observed with the aid of a stroboscope or a powered timing light while the engine is operating. No window is provided over this opening but the loss of oil is negligible. The water jacket of the block assembly was



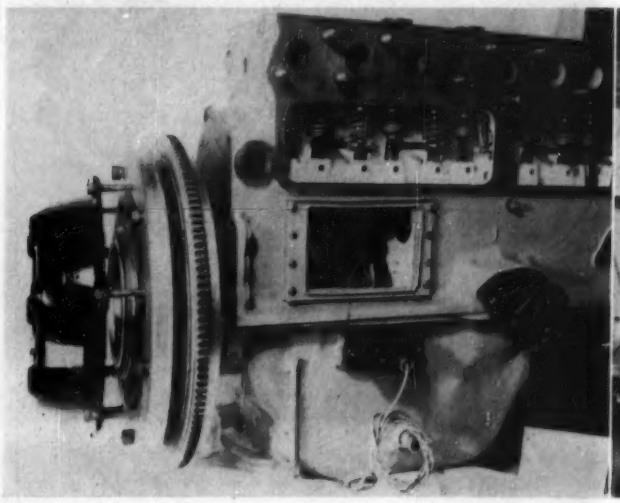
This view of the engine from the left rear shows the instrument panel mounted on the rear of the head and the timing light over the flywheel, the top of which has been cut out for observation. The drain for the waterjackets comes down over the bell housing. The hose from the rear of the block to the crankcase carries water for the copper coils in the oil sump which cools the oil and warms incoming water in the cooling system.



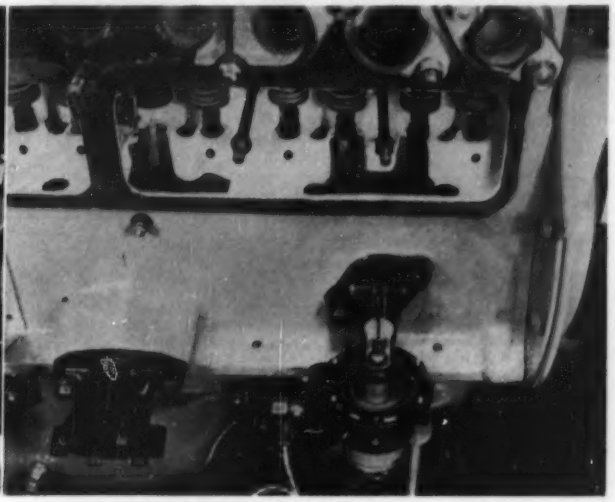
The gasoline tank can be seen in this right front view, resting on the bottom of the stand. A dynamic dampener is shown on the front of the crankcase. A light on the air cleaner shines down into the throat of the carburetor. Note the windows on the valve case and the modifications made in the manifold. The flexible exhaust pipe is locked on with thumbscrews. The water line behind the gas tank has garden-hose fittings.

welded closed at this opening so that water could be circulated in the cooling system.

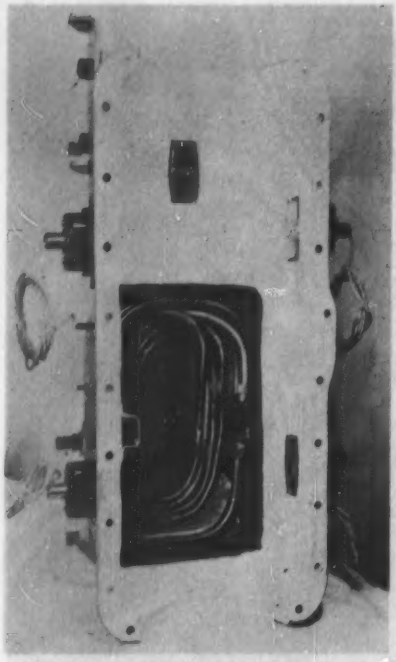
Two plastic windows allow observation within the internally lighted crankcase. One window was cut in the side of the engine block just below the rear valve chamber. The other window was cut in the curved section of the engine block where the generator is mounted. Plexiglas covers replaced the metal valve chamber covers so that the observation of the valve linkage would be visible. The timing chain cover was cut open but was not provided with a window. By proper metering of the oil to the front bearings no oil is thrown from the timing gear case.



Two flywheels, shown partially removed here, were bolted together to give about 80 lbs. of weight. Note the crankcase window and the lights installed in the valve case and in the crankcase sump. The inside of the engine is painted white for better visibility and contrast with moving parts.



This view of the right front side of the engine shows the openings cut into the valve lifter guides. The atmosphere side of the fuel pump has been cut away. Terminal below valve case is for lamps installed inside case. Note mounting of ends of the removed manifold stacks and gasket lines.



This inside view of the crankcase shows the parking lights from a '41 Chevrolet used for interior illumination. Oil cooling coils are in the sump. Bracket at the top is for mounting the generator.

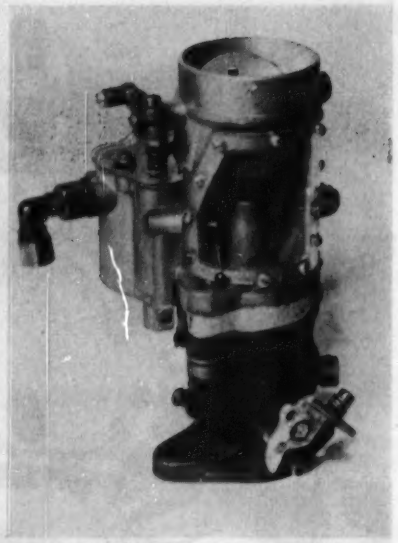
The carburetor has a plastic window in the side of the air horn so that the action of the main discharge nozzle and the choke valve can be noted. The float chamber cover was replaced with plastic so that the float linkage and the acceleration pump operation are visible. The carburetor is supplied with fuel by the engine-driven fuel pump which has the mechanical linkage and the atmospheric side of the diaphragm exposed to view.

One side of the distributor housing and cap was removed and the atmospheric side of the vacuum advance diaphragm was partially cut away so that the movement of the diaphragm can be observed as the engine manifold vacuum varies. The distributor supplies high-tension current in the usual sequence to all six spark plugs. The firing of the front three spark plugs is visible in the open combustion chambers. When a powered timing light is used with the unit, it is possible to illustrate the action of the weights of the centrifugal governor of the distributor and the action of the points and cam. The timing light can also be used to show the point of ignition in relation to piston position as the ignition is advanced or retarded.

The water pump is not used to circulate cooling-system water but is cut-away to expose the internal passages and the impeller which is driven by the fan belt. The fan belt also drives the engine-mounted generator in the usual manner to provide current for the ignition and lighting systems.

Sections of the bell housing and the starting motor are removed so that the switch contacts, armature, brushes, and the overrunning clutch drive are visible as the ring gear on the flywheel is engaged and the engine started.

The water contained within the engine cooling system will allow about seven minutes operation before overheating which is sufficient length of time for most demonstrations. For continuous operation, the cooling system is provided with standard garden-hose adapters so the engine may be connected to the nearest water faucet. To prevent possible overheating of the oil during extended periods of running, the incoming cooling water is first circulated through copper coils laid in the oil pan before going to the engine block. An expansion tank is provided on top of the cylinder head to insure a constant level of water in the engine.



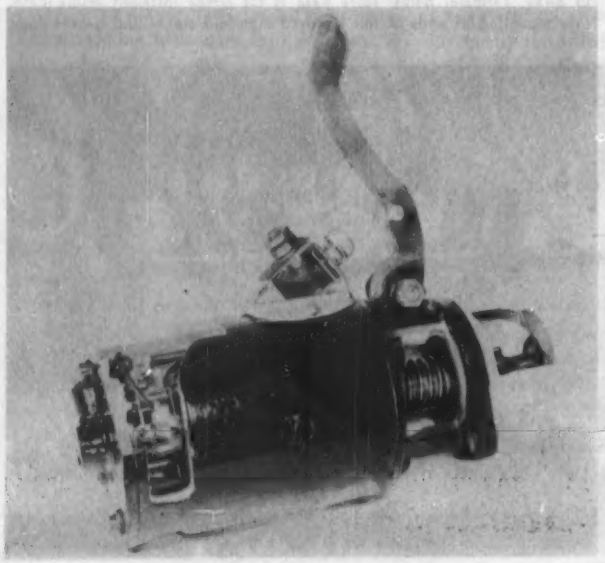
A '35 Dodge Stromberg BXOV-2 carburetor was used because the side of the air horn could be covered with a plastic window, also the float chamber. Gas overflow return projects at left.

The exhaust is silenced by a standard Plymouth muffler and eliminated out the nearest vent through a flexible steel pipe. The unit operates quietly and it is not difficult to lecture while the engine is operating at low speeds.

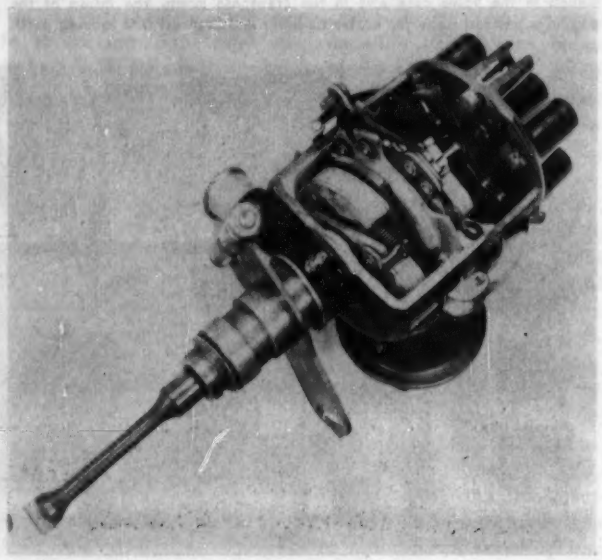
The unit has proved to be durable

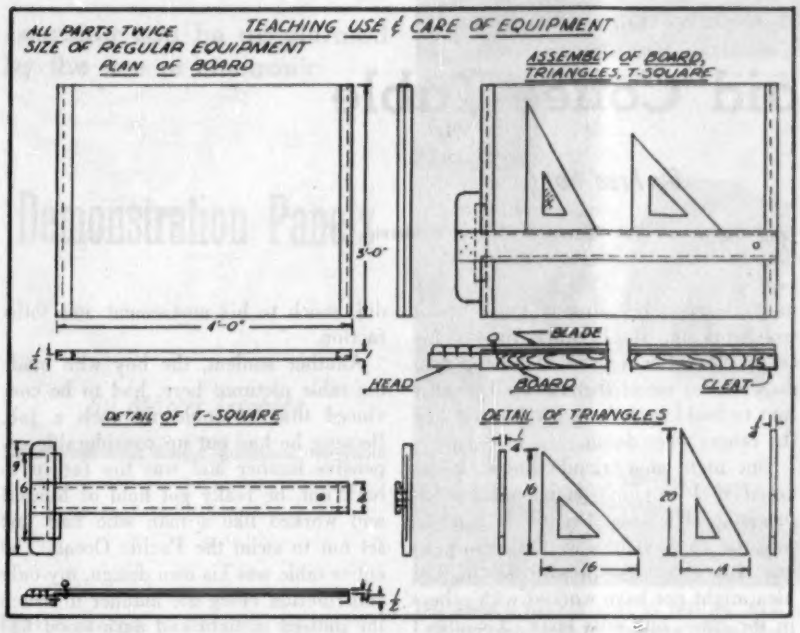
(*Continued on page* 47)

A large section of the commutator end of the starter frame has been cut away so that the armature, brushes, and one field pole are exposed. The switch has been cut open and two openings in the drive housing show it engaging the flywheel ring gear and cranking the engine in normal manner.



About two-fifths of the metal housing of a Dodge '39 distributor was removed to show the vacuum advance unit and the points and rotor as well as the counterweights. The original spring clips remain. One high-tension terminal has been cut away so that students can see how it is constructed.





Drawing Aid Helps Beginners

By Robert Houghton

Lincoln Park High School, Lincoln Park, Michigan

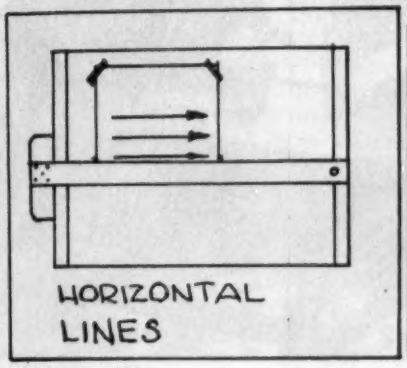
THE problem of teaching a roomful of students the basic principles of drawing is easily solved with this instructional aid. Instead of having beginning classes crowded around the instructor's desk in order to see what his hands are illustrating, this enlarged instructional aid is easily visible to each student from his desk.

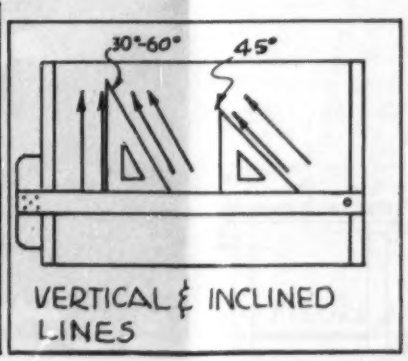
Basically designed to teach students to draw horizontal, vertical, inclined, and curved lines with the T-square, 45° and 60° triangles, board, and compass, the teaching aid also utilizes six illustrations which are color-keyed to the aid to make association and identification of the steps easier.

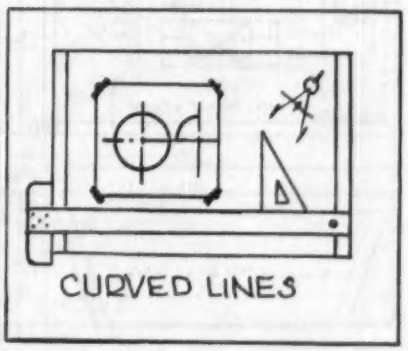
The final product is composed of a drawing board, T-square, two triangles, board compass, blackboard scale, and a felt pad pen. All items are constructed two times actual size. As use of the instructional aid proceeds, it is a good idea to explain the care in maintaining each of the instruments to the boys, in the hope that the proper care and use of drawing instruments will become an essential part of the student's education in general drawing. ★

Each step in drawing a vertical line, a curved line, or an inclined line is easily seen by the whole class when this portable instructional aid is used. Illustrations, seen at the right of the picture, are color-keyed to each piece of drawing equipment used for quicker identification by the youngsters.

Here are three samples of the illustrations used by the author when he presents the beginning principles of drawing to his classes. From the enlarged sketches, students can readily grasp the principles of a T-square, the use of a triangle, and their importance in drafting.







Help them discover the beauty in woodworking with this

Inlaid Coffee Table

By Fred Fogg

Walter T. Helms Junior-High School, El Cerrito, California

I HAVE pet projects in my classes, projects that seem to answer the need of not being too hard, not too easy, yet incorporating a wide range of experiences by the time they're completed. When the finished object can be picked up by other students, looked at from every angle and the usefulness easily seen, I find this project soon catches "fire" and the whole class benefits.

At the beginning of each year I look for and find the few rare students who I am sure have exceptional drive and "stick-to-it-iveness" rather than exceptional manipulative ability. As few youngsters in my classes are mature enough to realize that taking shop offers them a chance of a lifetime, I try to give these boys just enough push to get them interested in using the extensive equipment in my shop to their advantage.

This extra effort has paid off in recognition, for in every year except one, one or more of my students has won an award in the county or state, and on one occasion, two boys placed in a national contest with over 5000 entries.

Sometimes a little imagination on the teacher's part can open the door to initiative and achievement for a young boy. I had the satisfaction of realizing what my help could do in the case of Jerry.

Jerry was in his last year of high school and had taken woodworking for the past three years, plus three years in junior high. Besides this, his father had a workshop at home so there wasn't much Jerry didn't already know about woodworking. By Christmas time of his senior year I was tired of having him do work for me or the school; I wanted him to build something for himself like the others were doing.

One night at a friend's house, I was asked if I wouldn't make a lamp on the lathe. The friend would be glad to pay, he said. Here was the answer at last; I had been too blind to see it! The idea might not have worked with others in the class, but with Jerry, it couldn't fail.

Next day I presented him with an elaborate drawing of a lamp which I asked him to make. He started his usual grumbling, but complied with my request. He pointed out that he didn't like the design of the lamp, so I let him change it.

Before the week was out, the lamp was beautifully finished, as was customary with Jerry's work. And he was paid ten dollars. To make the story short, my friend had a friend who knew a guy . . . and during that month preceding Christmas, by working both at school and at home, Jerry made more money than I did, much to his amazement and satisfaction.

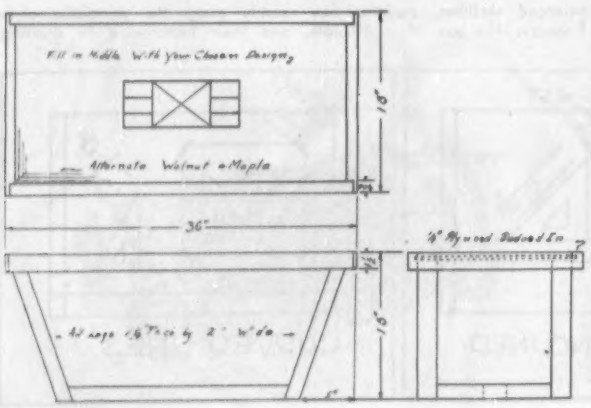
Another student, the boy who made the table pictured here, had to be convinced that he could do such a job. Because he had cut up considerable expensive lumber and was too far in to back out, he really got hold of himself and worked like a man who had just set out to swim the Pacific Ocean. The entire table was his own design, my only contribution being the manner in which the pattern of light and dark wood was put together.

Although this is a difficult project for the average junior-high-school student, I believe it is well to let a few take on the more intricate jobs. It is a wonderful thing to see a boy fired by his own ability and achievement to the point that he claims on completion he could build the next one in half the time.

After this youngster finished the table, he carved a very difficult and intricate statue. Both projects were sent to the Industrial-Arts Awards sponsored by Ford Motor Company and the statue placed in the competition. Had neither

(*Continued on page* 26)

Robert Cropek, right, with instructor Fogg, displays two intricate projects he did. The carved statue placed in national competition.

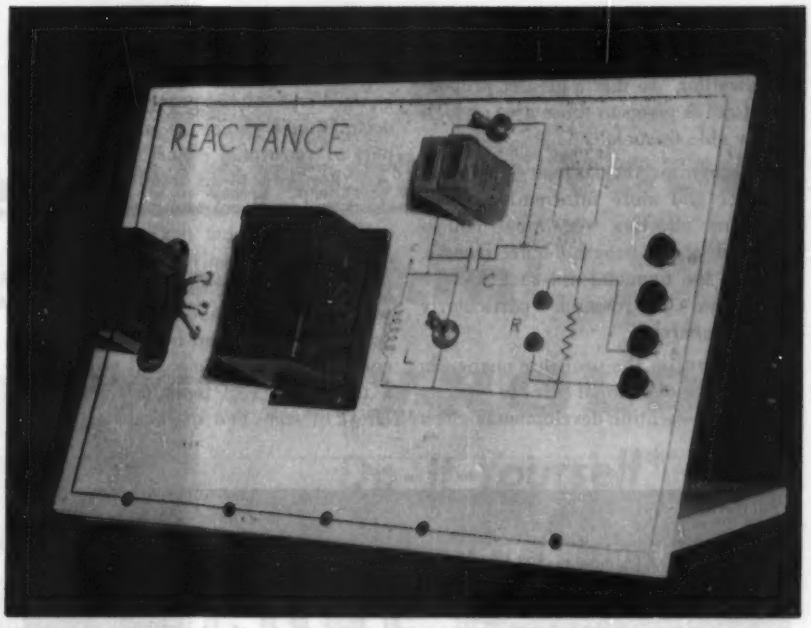


Learning can be accelerated by the use of electronic

Demonstration Panels

By Morris Tischler

Forest Park High School, Baltimore, Maryland



This panel is painted white so that the diagram and parts can be easily seen by the class. The lettering is large for the same reason. Parts are wired to the back with schematic on front.

THE process of learning depends on the cooperative action of our senses. Our eyes play the major role while hearing affects our learning to a lesser degree. For educational processes to be efficient, therefore, maximum use should be made of these two senses. With this in mind, a series of visual aids has been developed to be used in conjunction with lectures on electronics.

The demonstrations have all been built on panels of tempered Masonite measuring 13" x 18". It was found desirable to do all wiring on the rear of each panel and to diagram the circuit on the front. Simplicity has been stressed and emphasis is placed on maximum vision. Each demonstration is complete within itself except where d-c voltages are necessary.

A number of demonstration panels, such as the one described here, have been built and used successfully with many classes. Each demonstration is tied in with a lecture and is used to bring out important fundamentals. The panels are built of standard parts.

The demonstrations are designed for a technical, trade, or high-school training program in electronics. They can also be used in industrial-training programs. The description of the sample unit given here can be varied where necessary to use parts already available.

Once the building techniques have been developed for demonstration panels, many new ideas can be incorporated in them. The process is very dynamic and the results good. Following is a description of a sample demonstration panel:

(*Continued on page 26*)

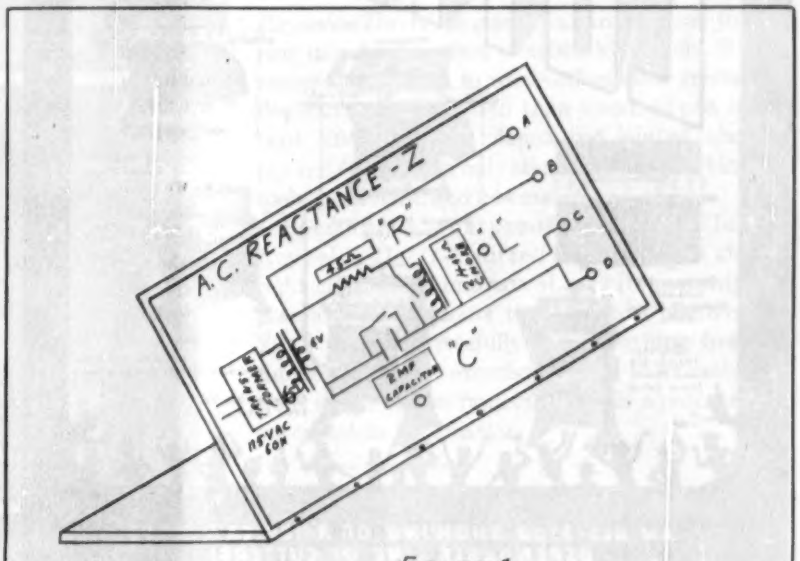


FIGURE 1

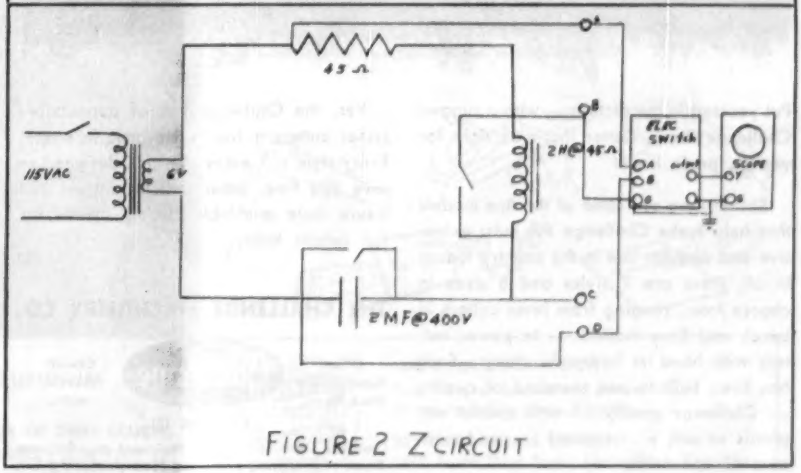


FIGURE 2 Z CIRCUIT

Planning . . . . . *from page* 11

2. Recognizes the principles of "equalization," so that a greater proportion of aid is given to those areas which are less able financially;

3. Recognizes the necessity for gaining more and more information about conditions affecting vocational education, and about program effectiveness. In short, the financial aid should place a premium on research—particularly "action research."

4. Recognizes the probable change in America's occupational life as technological and scientific developments affect business, industry, agriculture, and the home;

5. Recognizes the importance of organized educational processes leading to occupational choice as an inseparable part of vocational education;

6. Recognizes the reality that each state and/or local community can develop a lasting but flexible vocational-education effort only to the extent that the programs of vocational education within those state and local communities (*a*) are planned and believed in by the concerned local people, and (*b*) become a unified part of the total educational effort of state and/or local community.

Under these circumstances, federal aid to vocational education can continue to be of even greater benefit to the development of education, and particularly that phase of the educational program designed to help young people make a smooth and efficient transition from school-life to work-life, and to help adults progress in or change their occupations.

Financing Is a Tool

Finance (though valuable also as an "inducement") is a tool to accomplish a defined goal through agreed-on activities. If vocational-education development is to become an accepted goal of states and local communities, and considered a responsibility by them as an inseparable part of the total educational effort, original and forward-looking planning must not be tempered by external "pressure," financial or otherwise. Ideally, states and local communities will carry forward their plans, determine their directions and goals, organize potential programs, pave the way for increased excellence in existing programs; then look for the resources to help achieve these things. Federal aid, financial and professional, should be one of the resources which makes possible the realization of the plans laid and goals set.

The proposed legislation for federal aid to vocational education (S. B. 3271, now in "suspended animation"), designed to replace the current George-Barden and Smith-Hughes Acts, contains within it the expression of many of the sound principles in which we believe. The proposed act has limiting omissions (adult vocational education, for example), and contains some questionable procedural provisions (concentration of power in the U. S. Commissioner of Education, for example). But basically, it is a forward-looking piece of legislation. It would, with appropriate revisions, make possible a much narrower gap between what we know and believe about the way in which educational growth takes place, and what many of us do in terms of action. The "security" of the permanent appropriation clause of the Smith-Hughes Act should not create a blind-spot which will black out a road to a course of action which promises to help bring some of our basic ideals and our educational practices into a closer relationship.

Educators—and vocational educators in particular—must have the courage to look to the future, take full measure and advantage of the present, and learn with vision and wisdom the lessons of the past. ★

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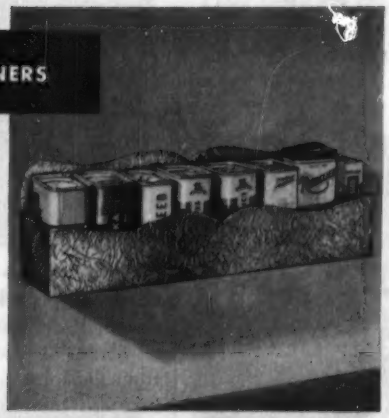

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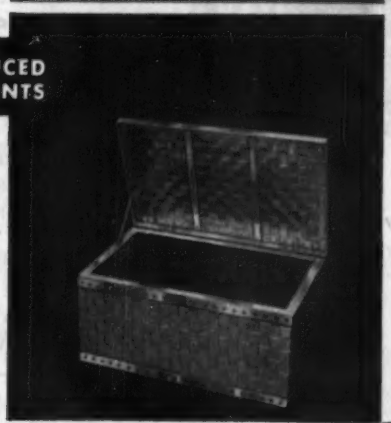

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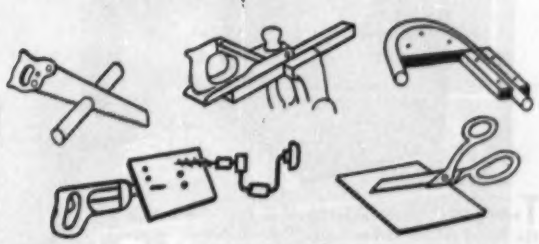

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School Shop KINKS

Payment will be made for each Kink published. Send to Editor, School Shop, Ann Arbor, Mich.

Tips on Paint Use

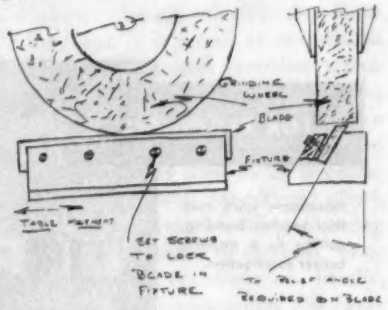
Here are some paint kinks I have found useful. A small tool is given away at most hardware or paint stores and resembles a screwdriver with a bent bit. It is invaluable in opening paint, varnish, or plastic wood cans. We keep two in our regular tool storage cabinets and several in strategic positions in the finishing room. They will open a friction lid can quickly and effectively without damaging the lid.

Punch a few holes around the friction groove in your paint cans when you open them so that excess paint from your brush will drain back into the can. Thus paint is saved and the lid will always fit.

If paint gets lumpy and difficult to use, strain it through an old nylon stocking. Unlike a sieve, it can be discarded when finished.—*Don Kinnaman, Junior High School, Rocky River, Ohio.*

Time-Saving Improvement

A six-inch jointer is built in our machine shop as one of our standard advanced projects. In making the blades for this jointer we have made good use of a simple fixture for grinding the relief angle and cutting edge. This fixture would be an efficient tool for any school shop to use in re-grinding blades for their jointers, if your shop has a surface grinder.



The fixture is extremely simple and all details can be discerned from the sketch. It is a simple matter to regrind all blades to protrude an equal amount from the jointer cutter head by controlling the micrometer downfeed of the wheel head to the same stop position for each blade.—*H. J. Gerber, Oklahoma A and M College, Stillwater, Okla.*

Circles Easily Stored

The problem of storing large aluminum circles in such a manner that they can be readily accessible, counted easily, and yet kept free of scratches can be easily solved through the use of a record rack.

The flocked surfaces do not scratch and the problems of space, inventory, etc., are easily solved.—*C. W. Johnson, Fairmont State College, Fairmont, W. Va.*

Switch for Safety

A constant source of danger when a novice is operating a machine is the reverse switch. If the boy becomes rattled while trying to shut off the switch on a lathe and turns it on reverse, the torque may unscrew the chuck and it will fly off the spindle while still spinning.

I believe it is a good idea to lock out the reverse when the machine is being used by a beginner. The simplest and most positive method is to discon-

Wanted—Teaching Kinks

SHOP teachers are urged to send in brief descriptions of kinks and short cuts which they have found helpful in their shop. Send to the Editor, SCHOOL SHOP, Ann Arbor, Michigan. Payment will be made for each kink published.

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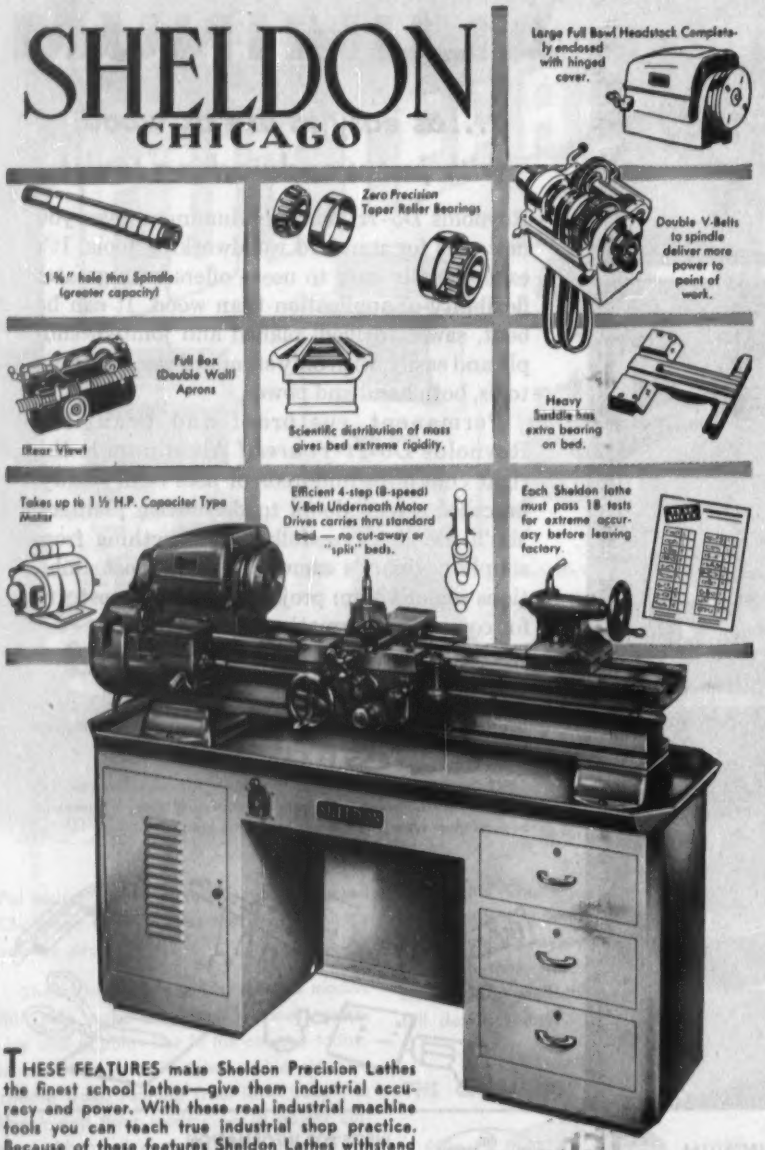
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nect one of the reverse wires from the switch. Other ways are to install some type of mechanical stop for the reverse button or handle so that the machine cannot be readily reversed.—*Glen M. Larsen, Santa Ana College, Santa Ana, Calif.*

Ink Storage Kink

To keep printing inks neatly arranged, we gave up on the old idea of the ink-storage drawer and designed a rack which definitely answers the purpose.

The rack is hung on the inside of the door of the press-roller cabinet. It is made of not-too-heavy sheet metal and notched so that the tubes of ink must be capped before they can be hung in place. This leaves the drawer free for mixing colors.—*Roland W. Williams, Abraham Lincoln High School, Philadelphia, Pa.*

Permanent Mounting is Easy

Blueprints, drawings for exhibition purposes, charts, etc., can be permanently mounted by this easy and inexpensive method.

Cut the mounting board (cardboard or cheap bookbinder's board) and a scrap of paper the same size as the print, allowing enough for the final mounting to be trimmed on all four sides. (The scrap of paper should be about the same weight stock as the print.)

Immerse print and scrap paper in cool water just long enough to get them wet all over, then drain off water by holding the sheets by one corner.

Place the scrap paper on a clean piece of glass, then put the print, face down, on top. Using a piece of tissue, hand towel or large blotter, blot off the surplus water. Apply starch paste with a flat brush to back of print, being careful to cover all parts and brush out well.

Remove the print from the glass and place, paste-side down, on the cardboard; smooth out with your hands. Cover with a clean paper towel and roll out thoroughly to remove air bubbles and to make perfect contact, working from the center to the edges. A rolling pin works well for this.

Paste the scrap paper on the back of the mounting board, using the same method. Then stand the mounted print on edge to allow air to circulate on both sides. When dry, the print will stretch so it's smooth and flat.

We use starch paste for adhesive as it will not have any chemical reaction to discolor the photograph or blueprint and it will hold indefinitely.

The paste is easily made by putting two tablespoons of common household starch in a metal container, adding just enough cold water to dissolve the starch and to form a heavy paste. Then slowly pour boiling water into the mixture, stirring constantly. When the paste shows clear, it is finished. Cool before using.—*W. W. Klenke, Central Commercial & Technical High School, Newark, N.J.*

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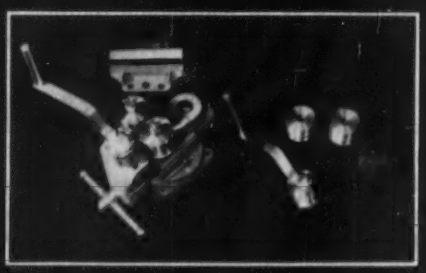

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A Plague on White Elephants!

BILL JONES was an ambitious young man who was rendering a public service by carrying on a profitable business in junk. As he meandered around his community he made a practice of visiting the local high-school shops at the end of each year.

On these occasions it was his custom to remove to a place of suitable burial the vast store of projects which might be classified as spoiled, unfinished, or unwanted. In assuming this responsibility he was performing a real public service since it relieved the teacher of an accumulation which had grown more and more embarrassing as the school year progressed.

But, one teacher says, "I never have any junk in my shop. I simply would not tolerate it." This is a happy situation for the teacher, but what about poor Bill? His business goes to pot, and he is compelled to join the ranks of the unemployed unless he displays his initiative by visiting the local dump and garnering a rich harvest from among the many contraptions he finds scattered there.

While we sympathize with Bill it might be of interest to inquire into the methods used by the teacher who has been successful in dispensing with the junk man. In the first place, he knows each of his pupils. He is aware of their aptitudes and their interests, and he does not permit a pupil to start a project unless he is reasonably sure that the pupil can finish it, and finish it in the time available.

Once the project is started, he supervises it closely, actively stimulates the interest of the boy, and encourages him in order to maintain his original enthusiasm until the job is finished. This is contrary to the procedure followed by some teachers who give the boy absolute freedom in his choice of a project, and then leave him to his own devices, in the belief that now the pupil has something that will keep him purposefully busy for the rest of the term.

Some teachers maintain high standards of workmanship. They measure each project in terms of the potential ability of the pupil who proposes to make it, and they scrutinize each one periodically as it progresses. By this means each step is approved before the next is undertaken with the result that the final product is apt to be acceptable. If, however, the finished job is substandard, the pupil is denied the privilege of taking it home. It is embarrassing to everyone when a project, which even the boy knows is poor, is examined by his family or friends.

In contrast to this, we find teachers who merely keep their pupils busy. When a pupil selects a project which is obviously beyond his ability, he is complimented on his ambition and is allowed to proceed with it. He goes along at his own sweet will, without adequate supervision, and when and if he completes it he is permitted to take it home regardless of how it looks. Of course the boy has been busy, and no one can say that his attitude toward his work has been at fault, but the results of his efforts are far from being acceptable. In cases like this the services of Bill are much to be preferred to the discouraging comments that are heard in the home when the horrible example is brought into it.

Excellent work can be done and is being done in our industrial-arts shops. It is conceded that all pupils cannot do

(*Continued on page 25*)

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2 Equipment is ready for use immediately in conjunction with your present shop or science courses. No complicated wiring or installation problems . . . no floor space or floor load difficulties.

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4 All parts are precision made and conform to highest engineering standards. They do the work of equipment which, if purchased separately, would cost many times as much, and they do it both safely and accurately.

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". . . I consider your publications and products unique and certainly the finest that I have been able to secure. I wish that the schools I attended had been equipped with them. I believe they fulfill a very great need on the part of the student, that of creating a genuine interest in a very important subject, regardless of his ultimate aim."

**Names will be furnished on request.*

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Contains 115 parts for performing 230 fascinating experiments. Guaranteed absolutely safe. Covers permanent magnetism; electromagnetism; circuitry, switches and fuses; transformers; bells, buzzers, relays; thermostats; DC and AC motors and controls. Comes with 284-page, profusely illustrated work-manual. Used successfully by instructors with no electrical training. Complete with hardwood carrying case, Model 41B is priced at only $47.50.

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Statistics reveal interesting sidelights on the

Future Supply of Industrial-Arts Teachers

By Ray C. Maul

Assistant Director, Research Division, National Educational Association, Washington, D.C.

QUALIFIED, competent manpower is much in demand in America today, particularly in the higher levels of professional service requiring extended preparation. Teachers of industrial arts may well be concerned about changing conditions because these changes can be expected to affect the future of this subject in the school program.

An examination of up-to-date facts is timely in order to look objectively at the present situation and establish a basis for future planning. The Seventh Annual National Teacher Supply and Demand Report* furnishes some of the needed facts. These are the pertinent questions:

1. How many men are emerging from the colleges, year by year, with preparation to teach industrial arts?
2. How many of these men, having completed a four-year program of preparation for this work, actually enter the classroom as teachers?
3. What happens, vocationally, to those who, having completed this preparation, do not become teachers?

Each year this national investigation brings to light the number who anticipate graduation at the end of the college year with the necessary professional preparation for the teaching certificate. These potential teachers are reported according to sex and major teaching field. The number who completed such preparation in the last preceding year is also confirmed. A study of these reports over a period of years discloses a trend and permits a projection into the years just ahead. These data concerning the production of candidates for teaching industrial arts are shown in Table 1 for the five-year period ending in 1954.

*The study is conducted and the report prepared by the NEA Research Division; it is published in the *Journal of Teacher Education*, V: 1 (March, 1954).

TABLE 1.—Total Number of College Graduates; Total Number Prepared to Teach Various High-School Subject; Total Number Prepared to Teach Industrial Arts; Percent of Change in Total Numbers from 1950 to 1954—All Colleges in All States

College graduates	*1950*	*1951*	*1952*	*1953*	*1954*
1	2	3	4	5	6
Receiving bachelor's degrees	433,734	384,352	331,924	304,857	285,000[a]
Percent change from 1950	.....	−11.4%	−23.5%	−29.7%	−34.3%[b]
Prepared to teach various high-school subjects	86,890	73,015	61,510	54,013	50,624
Percent change from 1950	.....	−16.0%	−29.2%	−37.8%	−41.7%
Prepared to teach INDUSTRIAL ARTS	4,890	4,284	3,161	2,570	2,165
Percent change from 1950	.....	−12.4%	−35.4%	−47.4%	−55.7%

[a]*Estimate.*
[b]*Calculated on estimate.*

Table 1 shows that in 1950 the total number of (bachelor's degree) college graduates reached an all-time high—nearly 434,000. Of this number, nearly 87,000 were prepared to teach one or more of the various high-school subjects. And of this latter number, 4,890 had major training in industrial arts.

In 1954 the total number of college graduates is 285,000; this is a drop of 34.3 percent in four years.

In 1954 the total number of graduates prepared to teach the various high-school subjects is 50,624; this is a four-year drop of 41.7 percent.

In 1954 the total number of industrial-arts majors is 2,165; *this is a four-year drop of 55.7 percent!*

The discovery of these facts leads to the second question: How many of these men, when they complete this college

TABLE 2.—Occupation, on November 1, 1953, of Members of the 1953 College Class Who Completed Requirements for Standard High-School Teaching Certificates; Occupation of Industrial-Arts Majors—13 States[a] and Hawaii

Field of preparation	Teaching		Otherwise employed		Continuing formal study		In military service		Homemaking		Seeking employment		No information		Total	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Various high school subjects:																
Men	2,914	43.0%	629	9.3%	690	10.2%	1,508	22.2%	0	0.0%	55	0.8%	985	14.5%	6,781	100.0%
Women	3,533	66.4	415	7.8	234	4.4	11	0.2	382	7.2	57	1.0	692	13.0	5,324	100.0
Total	6,647	53.3%	1,044	8.6%	924	7.6%	1,519	12.5%	382	3.2%	112	0.9%	1,677	13.9%	12,105	100.0%
INDUSTRIAL ARTS:																
Men	369	53.3%	79	11.4%	30	4.3%	112	16.2%	0	0.0%	2	0.3%	100	14.5%	692	100.0%
Women	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	1	100.0
Total	369	53.2%	79	11.4%	30	4.3%	112	16.2%	1	0.2%	2	0.3%	100	14.4%	693	100.0%

[a]*Connecticut, Illinois, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nevada, New Mexico, Utah, Vermont, Wisconsin, and Wyoming.*

course of preparation for teaching, will actually become teachers? There is no backlog of several years' reports to draw on, but there is available a representative report from all colleges in 13 states concerning what happened in 1953. These data are shown in Table 2.

In these states where complete reports were available, 692 men (and one woman) graduated with major training in industrial arts and the professional credits necessary for certification. This gross figure would be the obvious "supply" of candidates. Amazingly, only 369—just over 53 percent of them—were found to be engaged in teaching. In other words, the teaching profession was only a little more than 50 percent effective in its appeal to a group of men who were sufficiently interested at an earlier date to choose the courses leading to the certificate. (This situation is relieved somewhat by the unknown choices of the 16.2 percent who entered the military service; some or many of them might have sought teaching jobs, and may yet do so on their return to civilian life.)

Discouraging as this result may seem to be, the industrial-arts field fared better than all high-school fields combined, where only 43.0 percent of the eligible men followed through to become teachers (column 3, Table 2).

The most obvious question now is, what happened to the others? The answers are found in columns 4-15 of Table 2.

No less than 11.4 percent of the industrial-arts men (against 9.3 percent for all high-school men) were attracted to other types of employment. This, of course, reflects the application of industrial-arts training to the requirements of other jobs. Only 4.3 percent of the industrial-arts men were reported to be continuing with formal study, in contrast to the 10.2 percent of all men. The study shows that 16.2 percent of the men majoring in industrial arts were in military service. It is encouraging to note that only two of the 692 men included in this study were still seeking employment some months after graduating from college.

The colleges had no information about the vocational activities of 14.5 percent of their industrial-arts men. It seems likely that few, if any, of these men were interested in teaching, since college placement bureau relationships are usually strongest with their teaching candidates.

The struggle of industrial and vocational education to gain full status in the high-school curriculum has been impressive. Its enviable position rests on a solid foundation of instruction by competent, qualified teachers. The quality of instruction is the key to future progress—even to the maintenance of the present place of this subject among all high-school offerings.

The high-school enrollment is just now about to enter an era of unprecedented growth. It is reasonable to believe that the percent of all enrollees wanting industrial and vocational training may increase. The burden of this enormously expanded instructional assignment will fall heavily upon the present staff. If the challenge is to be met, this staff must have help of a kind that will sharply reverse the trends reported above. ★

Diamond Dust . . . *from page 22*

equally well, but there is a standard below which a project should be considered unacceptable.

Teachers of the present generation may not recall when the manual training—(industrial arts)—department supplied the universe with coat hangers and broomholders. When the sixth child in a family arrived home with his contribution to the supply of broomholders, mother was distressed because her supply of brooms had long since been exhausted. She was unable to unload the critter on the neighbor because she already had four, she was unwilling to throw it in the rubbish lest she offend her boy, so she was compelled to resort to subterfuge and pass it on to Bill on the sly with a request that he take it out and lose it. The modern teacher does not do this—we hope—so Bill's business is affected adversely.

We admire Bill, and he is engaged in an interesting and profitable business. Because of his industrious habits he should be encouraged in what he is doing. But let us not sacrifice the welfare of the industrial-arts program merely to provide Bill with a job. Let us minimize his activities in the school by having our pupils select their projects on the basis of their interest and ability, by closer supervision of each step as the work progresses, by providing encouragement and stimulation, and by maintaining standards of workmanship of which the pupils, the teachers, and the parents can be proud. ★

New members of the SCHOOL SHOP Editorial Advisory Board for three-year terms are CHRIS H. GRONEMAN, head of the industrial-arts department, Texas A&M College; G. C. HENRICKSEN, director of adult and vocational education, Portland, Oregon, schools; and WALTER R. WILLIAMS, JR., director of vocational education and consultant for industrial arts, Florida State Department of Education.

JON P. ADAMS, supervisor of trades and industrial education, Southern Illinois University, Carbondale, has been appointed director of the trades and industry division of Ferris Institute, Big Rapids, Michigan.

WILLIAM JAMES has been named director of vocational education in the New Albany, Ind., schools, succeeding GLEN BARKES who has been named superintendent.

W. CARLISLE ANDERSON has been appointed associate professor of industrial arts, Northern Illinois State Teachers College, DeKalb, Illinois.

ROBERT HUTCHCROFT of Oswego, N.Y., State Teachers College has been named associate professor of industrial arts at the University of Michigan.

NELSON A. HAUER has accepted a position as consultant in Technical Vocational education in Lebanon for the Foreign Operations Administration. He is on leave from Louisiana State University for two years, where he is head of the department of industrial education.

J. KELLY MUDD of the University of Oklahoma extension department has been named state supervisor of trade and industrial arts for Oklahoma.

J. G. GROVE has retired as head of the department of industrial arts at East Texas State Teachers College, Commerce. WELCOME E. WRIGHT of Texas A&M College has been named to the position.

C. J. GERBRACHT of State Teachers College, Mankato, Minn., has been named professor of industrial arts at Oswego, New York, State Teachers College.

HOWARD O. REED began his duties in September as head of the industrial arts department at Iowa State Teachers College, Cedar Falls. He replaced HAROLD G. PALMER who resigned because of ill health. ★

Demonstration Panels . . . .

from page 17

Impedance Demonstrator

Purpose: The purpose of this demonstrator is to apply the formula $Z = \sqrt{R^2 + (X_c - X_1)^2}$ to practical components so that the student will better understand the mathematical solutions of a-c circuits.

Construction: The transformer is of the filament type, and has a six-v secondary. Any convenient value will do. The three-henry choke and 2 μf/400v capacitor are connected in series with a 45-ohm resistor. These parts are placed on the Masonite panel as shown in Figure 1. Toggle switches are used to short out various parts of the circuit. Pin jacks are provided for the various outputs across each part.

Operation: An oscilloscope and an electronic switch (DuMont) are useful as auxiliary equipment. With the inductor switch open, close the line and capacitor switch, permitting current to flow through the resistor-choke circuit. Measure the voltage across the resistor R with a high-resistance meter and determine the current flow in the series circuit. $I = \frac{E}{R}$ will give this value. Measure the voltage across L and calculate the impedance of L. Use the formula $Z_1 = \frac{E_1}{I_1}$. As a check determine Z_1 by the following formula $Z_1 = \sqrt{R_1^2 + X_1^2}$ where $R_1 = 45$ and $X_1 = 2\pi fL$.

The reactance of the capacitor can be determined by $X_c = \frac{E_c}{I_c}$ where I_c is the same as the current in R. As a check, determine X_c by use of the following formula: $X_c = \frac{1}{2\pi fc}$. Close the L switch and open the C switch when determining current in R which is also I_c.

Determine the impedance by placing X_1, X_c and R (45+45) in the impedance formula: $Z = \sqrt{R^2 + (X_c - X_1)^2}$ where $X_c = 1130.4$ ohms

$X_1 = 753.6$ ohms

$R = 90$ ohms.

$Z =$ approx 387.1 ohms

The determination of the phase angle between R and Z can be calculated by $\sin 0 = \frac{(X_c - X_1)}{Z} = 77.8°$.

This angle can be placed on the oscilloscope by connecting an oscilloscope and electronic switch in the following manner. Connect the output of the electronic switch to the oscilloscope input. Connect pin A of demonstrator to one input of electronic switch and pin D to the other. Ground pin B. Adjust the gain control of the switch to about 30 or 40 percent of its gain. The angle is variable by adjusting the scope and switch. Adjust the various input controls and measure the angle on the scope with a protractor. Figure 2 on page 17 shows the connections of the test equipment to the circuit.

The demonstration was found to be exceptionally good with the discussions on a-c circuits. By replacing the values of the capacitor or resistors, problems could be set up for laboratory experiments. ★

Coffee Table . . . *from page 16*

entry received recognition, the boy would still have gained from these two projects, for now he no longer needs me to tell him what he can or cannot do . . . he has proved that to himself.

I feel that all too often we don't really give the pupils a chance to find out what they can accomplish. We give them too much leeway and as a result many of them never get around to turning out the work they are capable of. And the success of any industrial-arts program depends a great deal on the type of projects students can or are required to make. ★

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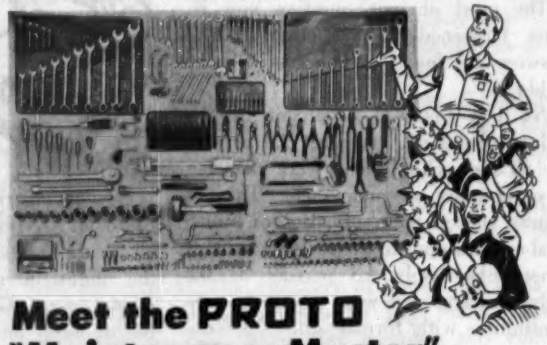

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News

HAPPENINGS IN INDUSTRIAL EDUCATION

A Joint Convention

THE Illinois Vocational Association and the Missouri Vocational Association will join forces in a cooperative convention this year. The meeting will be held March 3-5 in the Hotel Jefferson, St. Louis, Mo. Combined, the two sponsoring organizations have more than 5,000 members.

New Record in Minnesota

AN all-time record of 708 teachers taught industrial arts in the junior- and senior-high schools of Minnesota during the 1953-54 school year, according to information released from the Minnesota Department of Vocational Education. This number is 41 more than the previous year and 114 more than four years ago.

The figures also show that the total pupil enrolment in industrial-arts classes in the state has jumped from 55,154 in 1950-51 to 66,258. In 1952-53 the enrolment was 60,572.

In the various trade and industrial classes in the state, 11,287 pupils were enrolled during the 1953-54 school year.

New Facilities

PRACTICALLY every mail brings in additional information on increased industrial-education facilities throughout the nation. Among those recently called to our attention are the following:

Three vocational rooms and four industrial shops are included in the $2,794,000 North Penn Joint Junior-Senior High School under construction in Lansdale, Pa. The building is scheduled to be completed in November, 1955.

A new building for the industrial-arts and vocations classes of Crown Point, Ind., High School is scheduled to be completed this November. The building, 75' x 200', will contain a general shop area, machine shop, drafting room, lecture rooms, farm shop, blueprint room, and storage areas, offices, and washrooms.

In Minnesota, the St. Charles industrial-arts department is planning to move into its new shop this month, and a new industrial-arts shop is planned for Annandale. Bertha High School, also in Minnesota, has opened an industrial-arts department this year.

Ford IAA Winners Feted

THE 31 top winners in Ford Motor Company's 1954 Industrial Arts Awards competition and their instructors were guests of the Ford company from Sept. 30-Oct. 2 in Dearborn, Mich., to receive their awards and to visit attractions in and around Detroit.

The winners officially received their awards from Ernest R. Breech, Ford executive vice-president, at a banquet on Sept. 30. Wally Cox, TV's "Mr. Peepers," highlighted the entertainment program.

The students and teachers toured Greenfield Village and the Ford plant, and attended the Michigan-Army football game as part of their three-day activities.

A Club with a Purpose

THE Machinist Club of Crown Point, Ind., High School, is a little different than the average run of high-school clubs. It has as its aim the purchase of one machine a year for the high-school machine shop.

Carrying out this policy, last year the club purchased a No. 5 Wells Band Cut-off Saw to replace an old saw which had been given to the shop by Hammond Technical High School. To date the club has spent approximately $2100 on new and used equipment for the shop.

The club, organized by Lester Hale in 1946, raises money to buy the machines through sponsoring dances and an annual interclass club tourney. In addition to these activities the club goes

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on field trips, and has one party and one banquet per year. Last year it had 44 members.

To Hold Winter Meeting

THE Birch Coulee Industrial-Arts Association of Minnesota will hold its winter meeting on December 4. Floyd Wursetter of Gaylord is president of the association, and Curtis Johnson of Clarkfield, is secretary-treasurer.

New B/G Representative

MARVIN NEAL, former industrial-arts teacher in Macon, Ga., and a former president of the Georgia Industrial-Arts Association, is now a representative for Brodhead-Garrett Company for the states of North Carolina, South Carolina, Georgia, and Florida. He will continue to make his home in Macon.

Printing Scholarship List

THE Education Council of the Graphic Arts Industry has released a list of scholarships sponsored by the printing industry. The list, which was compiled by the Council over a nine-month period, shows the types of scholarships offered by the graphic-arts industry in all sections of the country and the number of institutions of higher learning participating in this program. For a free copy write the Education Council of the Graphic Arts Industry, Inc., 719 Fifteenth St., N.W., Washington 5, D.C.

Plan Project Fair

PLANS for the fourth annual North Carolina State Project Fair to be held in May, 1955, at Myers Park High School, Charlotte, are now being made following the highly successful fair held last spring in Lindley Junior High School, Greensboro. At that time more than 3000 persons viewed the 500 projects on display.

Tom Haigwood of Hawthorne Junior High School, Charlotte, is president this year of the North Carolina Industrial-Arts Association, sponsor of the fair. Vice-president is David Rigsby of Curry Training School, Woman's College, Greensboro; and secretary-treasurer is Marshall Schmidt of State College, Raleigh.

Teachers College Adds Trade Education Department

SOUTHERN State Teachers College, Springfield, So. Dak., has established a trade education department to offer training for trades at low cost to high-school graduates who desire further education strictly on a vocational basis. Types of training offered include upholstery, cabinet making, carpentry, drafting, and auto mechanics. Trade students spend all day in the shops. Two new buildings have been provided for the students with modern equipment. A trade major program also is available under which degrees in the shop field may be earned.

GI Continues Training

Now stationed in Europe with the 65th Army Postal Unit, PFC Glenn R. Hiestand of Eugene, Ore., is continuing his related carpenter apprentice study through the united efforts of his commanding office, his local union, the

Convention Calendar

New England Industrial Arts Association, Hotel Carpenter, Manchester, N.H., Nov. 5-6.

West Virginia Industrial-Arts Association, Fairmont State College, Nov. 5-6.

American Vocational Association, Civic Auditorium, San Francisco, Calif., Dec. 2-7.

Illinois Vocational Association and **Missouri Vocational Association,** Cooperative Convention, Hotel Jefferson, St. Louis, Mo., Mar. 3-5, 1955.

New Jersey Vocational and Arts Association, Asbury Park, March 17-19.

Indiana Industrial-Education Association, Purdue University, West Lafayette, March 17-19.

American Industrial Arts Association, Atlantic City, N.J., April 26-30.

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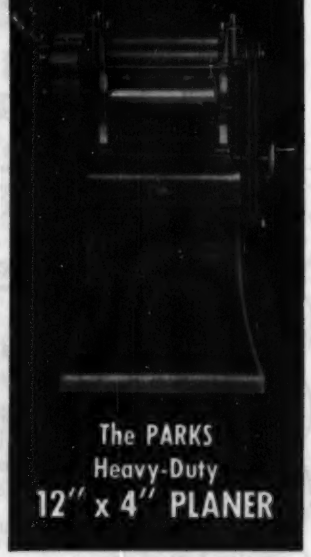

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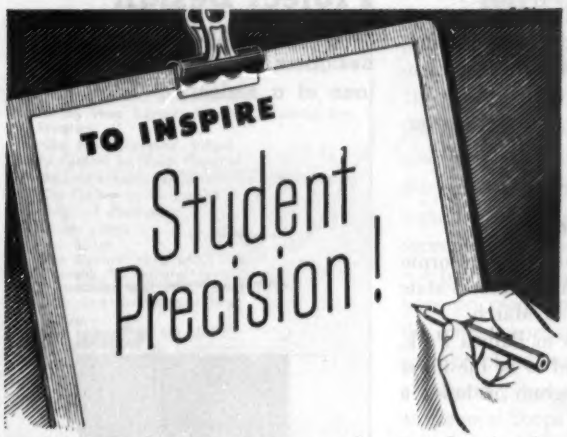

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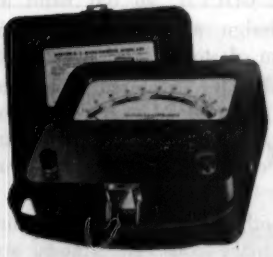

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New York Conference

THE thirty-ninth annual professional conference for leaders in vocational and practical arts education of New York was held Oct. 10-13 at Lake Placid Club. The conference, sponsored by the New York State Education Department, had as its theme "Educational Program Analysis and Evaluation."

Among the speakers at the meeting were Franklin J. Keller, principal of the Metropolitan Vocation High School, New York City; Frederick J. Moffitt, associate state commissioner for elementary, secondary, and adult education; and Lynn A. Emerson, Cornell University, Ithaca, New York.

Down Mexico Way

PLANS have jelled for the California Industrial Education Association's state convention, scheduled in March.

Convention facilities in Balboa Park, San Diego, are reported to be the finest in the state. The program includes a trip into old Mexico.

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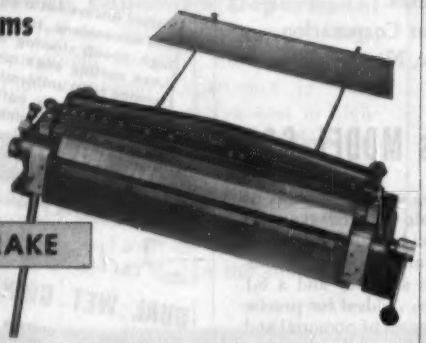

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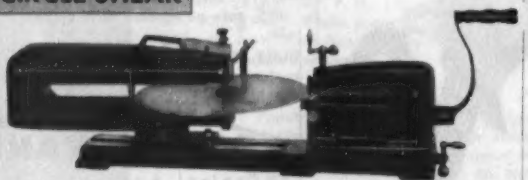
Finger-tip controls on both ends of top roll permit quick adjustment for any material thickness within capacity of unit. Will accurately roll 24" widths in 20 gauge mild steel—heavier gauges in narrower widths. Removal of work is easily accomplished due to the spring loaded, hinged, top roll. Heavy duty rolls 1½" diameter—distortion proof channel iron base, enclosed gears and oilite bearings are a few of many features.

24" RING AND CIRCLE SHEAR



Equipped with MICRO-FEED control of circle diameters—an exclusive feature. Cuts rings and circles up to 24" diameter. Handles a wide variety of trimming operations, strip cutting and contour cutting on sheet metal up to 20 gauge. Cutters are hardened, tempered tool steel. 32" x 7" bed length, 12" x 4½" shear, and 21" x 3¾" clamping head. Accurately machined, enclosed gears and rugged construction throughout.

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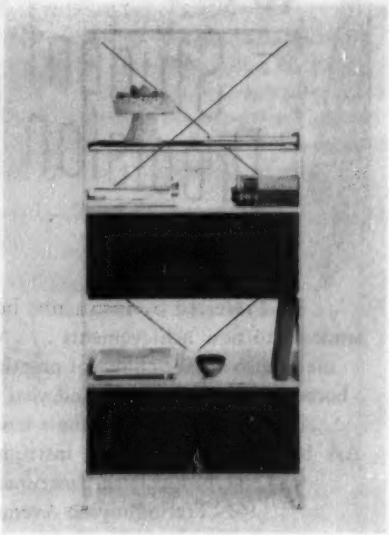
Project Design

What the industrial designers are doing (one of a series)



FLEXIBLE STORAGE UNIT
Designer: ALLAN GOULD
Manufacturer: ALLAN GOULD DESIGNS, INC., NEW YORK

ALLAN GOULD, an old hand at winning design awards, tackles here the problem of storing various objects.

Some things to be stored should be out in the open to be seen (and even consumed). Others are better off in drawers to eliminate clutter—handy but unseen.

On the other hand, our possessions do not remain constant. Things are bought, lent out, broken, and discarded. Our tastes and interests change, giving rise to new storage problems.

Mr. Gould was aware of all this when he designed the above piece of furniture. Not only did he provide both open and closed storage but also designed it so that, very simply, the owner could move the shelves and drawers about and even replace them with others if he so desired. The owner of the above storage unit could put in all book shelves if he chose to do so. Or, he could buy all drawers.

The heavier vertical and horizontal members are of Finnish birch; drawers can be had in birch and/or black finish; wire shelves are painted with a satin black. Note how the wire braces are placed for stability which is often lacking in furniture of this kind.—*Robert A. Tinkham, Assistant Professor of Industrial Education, University of Illinois, Urbana.* ★

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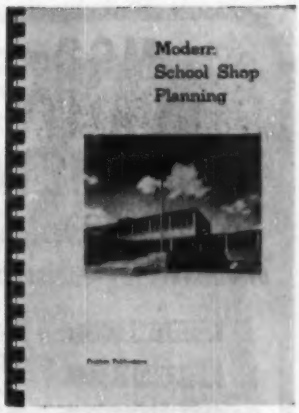

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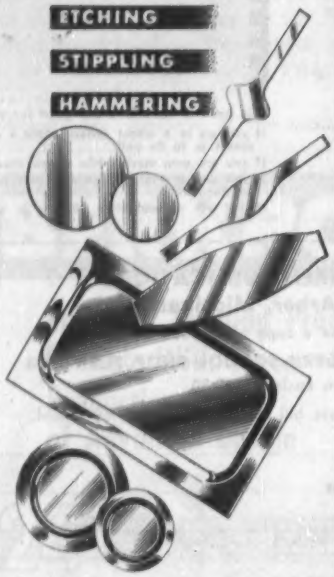

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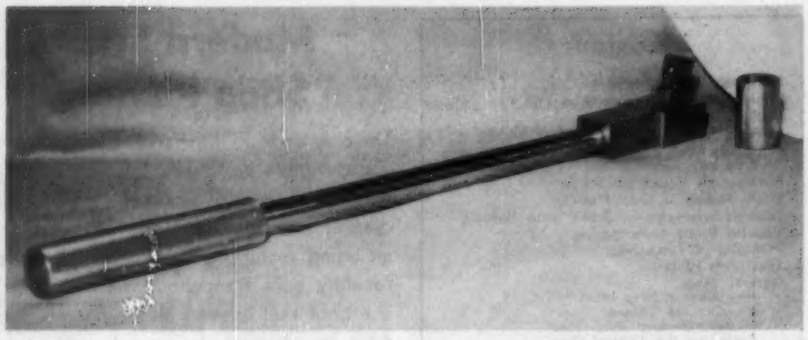


There is much to be learned in making this useful

Socket Wrench

By Royal N. Wilson

Mexico High School, Mexico, Missouri

A MACHINE-SHOP project that will be useful to the student and provide worthwhile learning experience is this socket wrench. Construction will require layout work, operations on the lathe, drill press, and milling machine, as well as finishing and assembling. The plan of procedure should be developed by the student and checked by the instructor.

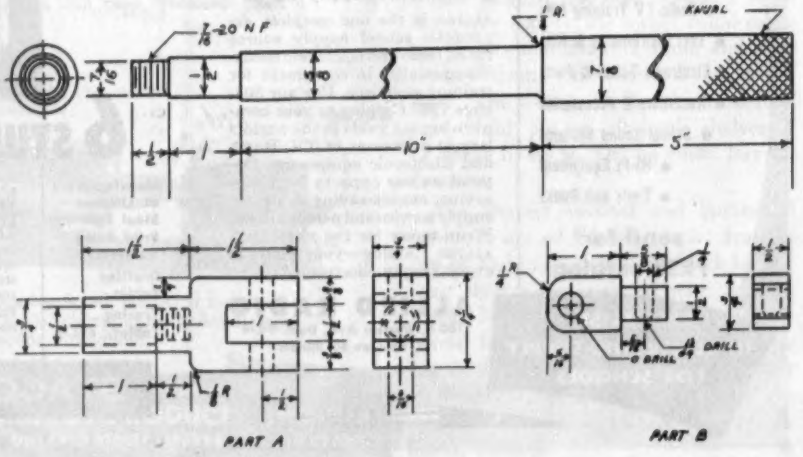
Cold rolled steel should be adequate for the handle. Parts *A* and *B* should be made from medium carbon steel.

In Part *B*, a ¼" ball bearing that protrudes 1/32" from the surface is used to hold the socket firmly. This is done by drilling a 13/64" hole through and then drilling a ¼" hole to a depth that will allow the ball to protrude the desired 1/32". Tension is held on the ball by a spring approximately ⅜" long. Both the spring and the ball are kept in place by a short plug pressed into the other end of the hole. Care must be taken to allow the ball freedom to move back and forth.

The handle should fit firmly into Part *A*, since this is where much of the stress will be when in use. The threads should be a Class 3 fit, as there should be no reason for removing the handle after assembly.

Parts *A* and *B* should be held together by a pin pressed into the 5/16" hole. An *O* drill should be used for Part *B* to allow it to rotate freely on the pin.

When assembled and polished, this good-looking project is one that any boy will be proud to have among his tools. ★



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Concrete Christmas-Tree Stand

By C. E. Ford

Manly Junior-High School, Louisville, Kentucky

JUNIOR-HIGH students will take notice when you introduce this concrete Christmas-tree stand as a project. Not only is it designed to hold water so the tree will retain its needles throughout the season, but it is heavy enough to prevent tilting, making the erecting of the tree a simple task.

The stand itself can be made by seventh- and eighth-grade students; forms for the stands can be made by eighth- or ninth-graders. A bit of metalwork is included in this job—sawing pipe, filing pipe ends, drilling holes in a section of pipe, and tapping threads in the holes.

Two sizes are shown in the picture, the one on the right being made in the form shown. The smaller stand is 8" x 8" square and 6" deep and weighs 30 lbs. The larger one weighs 45 lbs. and measures 10" x 10" x 6" deep. Either stand will hold one quart of water and the small stand is adequate to take care of the tree commonly used in the classroom or at home.

A form should not contain more than four stands; however, we cast only two stands at once. The forms are of wood, and we tacked corner strips in each corner to break the sharp edges of the square. A coating of linseed oil waterproofs the wood and prevents the concrete from sticking to the form. Forms made of metal would produce a smoother finish with less trouble.

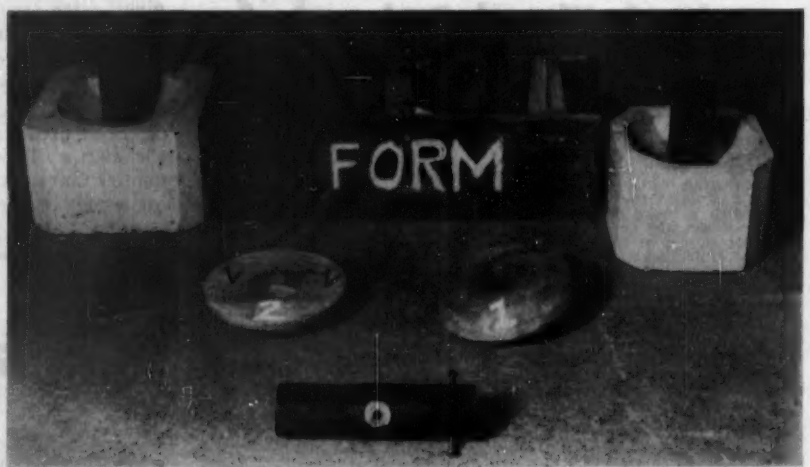
Insert pieces (1 and 2) were turned on a lathe, with the holes large enough to fit loosely over the pipe used in the stand. Two screws are fastened in these form pieces to serve as hand grips while shaping the recessed section of the stand.

The pipe or support piece is made of 1½" or 2" iron pipe. We cut these to a 9" length. Threads were left on one end, but that is not necessary. Ends should be filed square and all sharp edges removed. Drill three holes 1" from the top of the pipe, spacing them equally and tapping them out to take set screws. We tapped them with a ¼" # 20 tap, to fit ¼" r-h stove bolts as screws to hold the tree in place.

A ⅜" hole is drilled 4¼" from the top. This opening drains water into the pipe at the bottom of the recessed space. Flatten a few places on the lower section of the pipe by filing to anchor the pipe to the concrete. Set screws could be used to give this anchorage. (Incidentally, second-hand pipe is adequate for this job and can often be obtained free, or at the price of scrap iron.)

Make a shallow tray from sheetmetal, using it to mix the cement and sand (dry) in a one-to-two mixture, then carefully add water so as not to get the

(*Continued on page* 45)



These heavy concrete stands are tip-proof and hold a quart of water. The youngsters like them.

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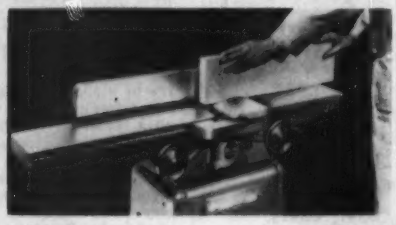
News from INDUSTRY

(Circle the numbers on the card in this issue to secure the items listed.)

"Long-Bed" Delta Jointer Introduced by Rockwell

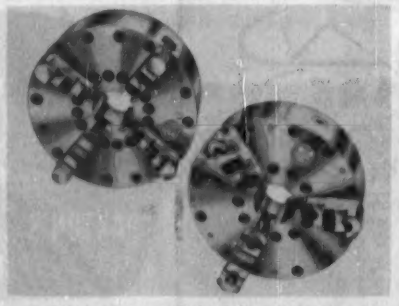
A new "long-bed" 6" jointer, introduced by Delta Power Tool Division of Rockwell Manufacturing Company, offers time and cost-saving features. The new tool has a 42½" bed that insures a true cut the entire length of a long board.



Other important features include a fully adjustable outfeed table, universal fence control, improved table-elevating mechanism, and a new safety-engineered guard. The outfeed table makes it possible to adjust the table to the cutterhead with a single hand wheel. The universal fence control is achieved by means of a single control handle which positions the fence for both width and angle of cut. The tension guard features a torsion spring assembly which makes possible any number of tension adjustments. The guard can be removed instantly, replaced quickly, and locked to prevent unauthorized use. The unused portion of the cutterhead is always covered, the manufacturer states.

For more information write Delta Power Tool Division of Rockwell Manufacturing Company, 435 N. Lexington Ave., Pittsburgh 8, Pa., mentioning SCHOOL SHOP; or *circle no. N1 on the business-reply card.*

Whiton Segmented Plate Chucks Said to be Different in Design



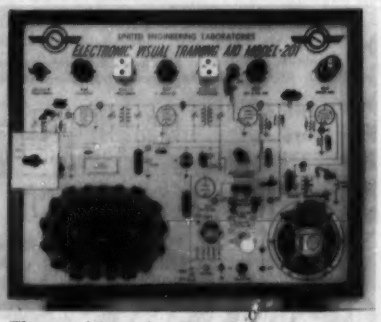
A different type of design and con truction is featured in a new line of machine-tool chucks offered by The Whiton Machine Company. Called Whiton Segmental Plate Type Chucks, they are said to be an improvement on the conventional chuck design in that jaw slots are formed in separate, segmented plates which are subsequently mounted on the chuck body. Since these plates are hardened and finish ground before assembly, the jaw slots are said to be extremely accurate and to possess unusual wearing qualities.

The segmental plates may be mounted on a heat-treated steel body, a body of ductile iron, or a body made of aluminum alloy. The new chucks are offered in both independent and geared scroll models.

For more information write The Whiton Machine Company, New London, Conn., mentioning SCHOOL SHOP; or *circle no. N2 on the business-reply card.*

Electronic Visual Training Aid Offered by United Engineering

A new electronic visual training aid designed for easy instruction in basic radio and electronics has been placed on the market by United Engineering Laboratories.



The teaching of schematic reading, color codes, parts identification, trouble shooting, wiring techniques, and circuit adjustment is possible with the unit. The training aid is designed as an operating radio receiver and also provides basic testing equipment for the trouble shooting and servicing of other defective radio receivers. The 17" x 22" display board is printed in three colors for easy group instruction.

This Model 201 training aid is available in kit form or completely wired and tested. For more information write United Engineering Laboratories, 237 Washington St., Newark 2, N.J., mentioning SCHOOL SHOP; *or circle no. N3 on the business-reply card.*

Pres-Kit Patterns Stick to Wood, Eliminate Tracing

New adhesive-backed Pres-kit patterns, introduced by Wax-Bax Pattern Company, are said to eliminate all tracing and measuring previously required for wood-shop projects. The patterns stick down directly on the stock, stay in place while pieces are cut, yet peel off when the job is ready to assemble.

Pres-kit patterns range from simple projects like serving trays to coffee tables and chests. Each package contains a set of illustrated instructions.

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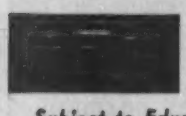

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For more information write Wax-Bax Pattern Company, 235 E. Walnut St., Louisville, Ky., mentioning SCHOOL SHOP; *or circle no. N4 on the business-reply card.*

L-W Chuck's New Attachments

The L-W Chuck Company now is offering draw-in bar and collet sleeve attachments for use with its dividing heads. One of the new attachments is for use on its 11" models BP and AU heads and will take up to ¾" round, standard-type 2L collet. Another, for use with its 6½" Model SD head, takes up to ⅝" round, standard-type 4 NS collet.

More information can be obtained by writing L-W Chuck Company, 69 E. St. Clair St., Toledo 4, Ohio, mentioning SCHOOL SHOP; *or by circling no. N5 on the business-reply card.*

New Amaco Enameling Kilns

American Art Clay Company has announced two new models in the Amaco line of metal enameling kilns.

The new Model 67-E has an all-metal exterior and has a large firing chamber 10" wide, 12" deep, and 5" high. Long-life elements on each side of the firing chamber are completely enclosed in durable refractory holders.

A new two-piece kiln of all-ceramic construction has been developed to meet the need of a small, low-cost kiln for schools and hobbyists. This model, known as the Fine-Art Enameling Kiln, is 7" high and 7" in diameter. The bottom section, which rests on three ceramic legs, contains the firing chamber which measures 6" in diameter and 2½" in height.

Both new models operate on 110-115 volt output. For more information write Ceramic Department, American Art Clay Company, Indianapolis 24, Ind., mentioning SCHOOL SHOP; *or circle no. N6 on the business-reply card.*

Economy-Size Porta-Draft Kit Introduced by Berger

A new economy-size student's drafting kit which combines all essential classroom instruments and materials in one portfolio case has been introduced by Berger Scientific Supplies, Inc.

Like the larger All-in-One Berger drafting kit, the new Porta-Draft kit contains a choice of different sets of drawing instruments, precision-made in the American Zone, Germany. Standard equipment with each kit also includes a protractor, 12" triangular scale, 8" and 6" triangle, French curve, pencil pointer, drawing pencil, and two erasers. Two inner compartments provide carrying space for drawing paper, notes, and blueprints.

For more information write Berger Scientific Supplies, Inc., 37 Williams St., Boston 19, Mass., mentioning SCHOOL SHOP; *or circle no. N7 on the business-reply card.*

New Handy Angle Saw Is Versatile and Economical

Versatility and economy are two features claimed for a new Handy Angle saw being distributed by Price & Rutzebeck for use with an electric drill. The complete saw unit, although less than 7" in length and weighing less than 1½ pounds, is of rugged construction, the company points out, permitting it to be used at speeds from 1800 to 3500 rpm on iron pipe, corrugated sheetmetal, wood, masonite, and other building materials.

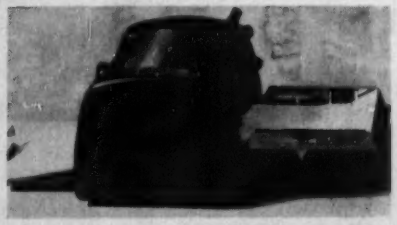
The tool will cut its own starting hole. Special interchangeable blades are manufactured for the saw. Both the bayonet type for contour cutting and tapered type where rigidity is needed are available with a choice of 10, 14, and 18 teeth per inch. All blades are capable of cutting metal.

For more information write Price & Rutzebeck, 22150 Meekland Ave., Hayward, Calif., mentioning SCHOOL SHOP; *or circle no. N8 on the business-reply card.*

New Ceramic Spray Booth

A new ceramic spray booth designed for schools and home ceramists has been introduced by O. Hommel Co. of Pittsburgh, Pa. The inexpensive booth, which is 2' x 2' x 2'4" on a stand 2'8", is shipped ready to use complete with motor and exhaust unit. It is finished in green hammertone with a black stand. For more information write O. Hommel Co., Pittsburgh, Pa., mentioning SCHOOL SHOP; *or circle no. N9 on the business-reply card.*

A. B. Dick's New Azograph



A new short-run duplicating process called Azograph has been announced by the A. B. Dick Company. The process produces up to 75 copies without staining hands, clothing, or the work itself. It employs two separate color forming compounds within the coating of the master sheet. These compounds cannot unite to form color until a third, a reactant in the fluid on the duplicating machine, is introduced.

Both electrically- and hand-operated machines for Azograph duplicating are being manufactured by the A. B. Dick Company.

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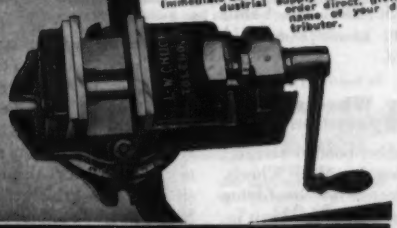

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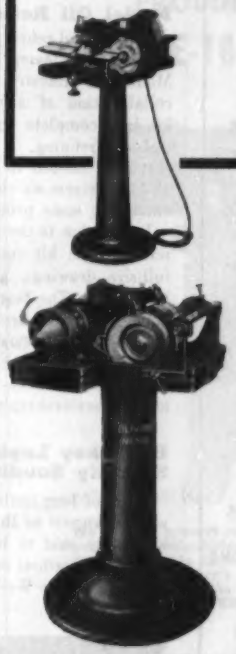

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For more information write this company, 5700 W. Touhy Ave., Chicago, Ill., mentioning SCHOOL SHOP; *or circle no. N10 on the business-reply card.*

Model Oil Refinery Kit

A model oil refinery kit, designed for junior-high-school classes, has been produced by Models of Industry, Inc., with the technical collaboration of a major oil company. The kit is a complete unit of study on basic petroleum refining. It contains all plans and materials needed to build the model refinery and to perform six classroom experiments demonstrating some principles of oil refining.

In addition to the materials for building the refinery, the kit contains a nine-page set of full-size drawings, a master lay-out sheet, a booklet on "The Story of Oil," a 64-page handbook, and a teacher's manual.

For more information write Models of Industry, Inc., 2100 Fifth St., Berkeley, Calif., mentioning SCHOOL SHOP; *or circle no. N11 on the business-reply card.*

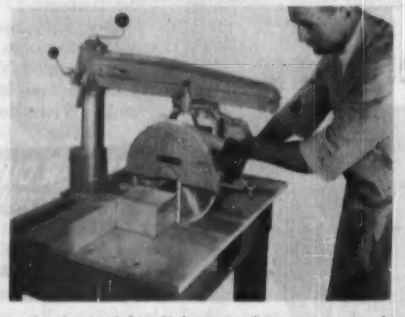
Brightboy Lapidary Wheels Simplify Sanding Operations

A set of long-lasting rubber-bonded abrasive wheels, known as Brightboy Lapidary Wheels, which are said to be effective in simplifying sanding operations on gem stones, has been introduced by the Weldon Roberts Rubber Company.

The manufacturer states that the soft rubber binder and the abrasive, working together achieve fine results. The padding and fuss of sanding cloth are eliminated.

For more details write Weldon Roberts Rubber Co., Brightboy Lapidary Dept., 95 N. 13th St., Newark, N.J., mentioning SCHOOL SHOP; *circle no. N12 on the business-reply card.*

DeWalt Introduces New Model Woodworking Machine



A new model radial arm multi-purpose woodworking machine has been introduced by DeWalt Inc. The new model, designated the GWI, offers many advantages not previously available in this type of machinery, the company states. The motor will develop a full 1½ horsepower and is provided with a voltage-change switch to enable it to be operated on either 115 or 230 volt, single phase current. Using the 10" blade supplied with the machine, the cut-off capacity of the GWI on 1" material is 16". It is capable of ripping to the center of a 52" panel.

Other new features of the GWI include a multicolor Plextone finish replacing the standard machinery-gray paint previously used on Power Shop models, attractive red plastic control handles for safe adjusting of moving parts; a safety lock switch which functions on the ignition key principle; a longer radial arm and wider work table; and built-in carrying handles for easy portability.

For more information write DeWalt Inc., Lancaster, Pa., mentioning SCHOOL SHOP; or *circle no. 13 on the business-reply card.*

New Literature:

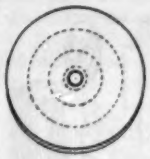
Attachment and Accessories Catalog 5418 is a new catalog offered by South Bend Lathe to illustrate the company's complete line of machine-tool attachments and accessories. Included in the 40-page catalog are specifications for accessories and attachments to South Bend lathes, drill presses, shapers, and grinders. For a free copy write South Bend Lathe, South Bend 22, Ind., mentioning SCHOOL SHOP; *or circle no. N14 on the business-reply card.*

Drawing Instruments is the title of a new 32-page booklet issued by Frederick Post Company on the Post line of drawing instrument sets and accessories. Colorfully illustrated, the booklet describes in detail multiple combinations of drawing instruments that may be selected to suit individual requirements. For a free copy write Frederick Post Company, Box 803, Chicago 90, Ill., mentioning SCHOOL SHOP; *or circle no. N15 on the business-reply card.*

Allied Radio Corporation's 1955 catalog lists more than 25,000 items in its 308 pages of radio, television, and electronics parts and equipment. The catalog has an expanded section on training kits, test equipment, books, diagrams, parts and tubes, and other equipment required for radio and electronic training activities. For a free copy write Allied Radio Corporation, 100 N. Western Ave., Chicago 80, Ill., mentioning SCHOOL SHOP; *or circle no. N16 on the business-reply card.*

P & H Copymaster Bulletin No. 5405 is a new release by Peck & Harvey Manufacturing Corp., describing the various models of Copymaster whiteprinters, which produce black line and colored line ammonia-dry whiteprints. For a copy write P&H Sales Corp., 5640 N. Western Ave., Chicago 45, Ill., mentioning SCHOOL SHOP; *or circle no. N17 on the business-reply card.*

A new catalog has just been published by the Precision Equipment Company. Many new items have been added to Precision's standard line consisting of steel shelving, lockers, ladders, and other storage and maintenance equipment for school-shop and industrial use. This well-illustrated, 24-page catalog may be obtained by writing Precision Equipment Co., 3702 N. Milwaukee Ave., Chicago 41, Illinois, mentioning SCHOOL SHOP; *or circle no N18 on the business-reply card.*



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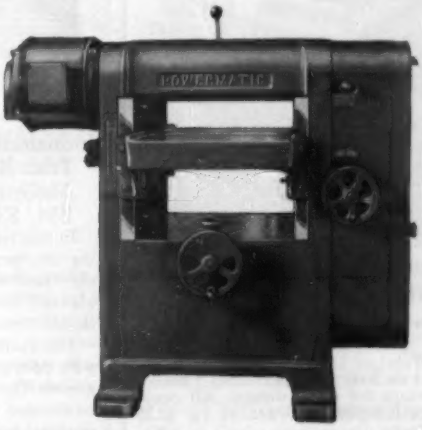

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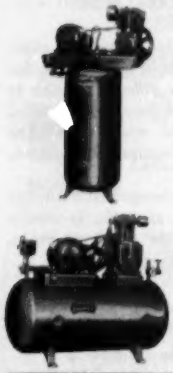

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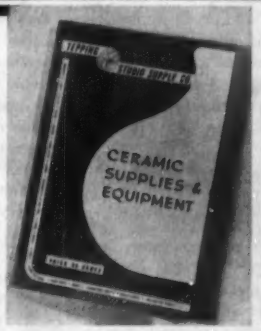

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Instructional RESOURCES

Books:

Industrial Arts Drawing and Blueprint Reading. Coover. New York: McGraw-Hill Book Co., 1954. Pp. 254. $3.96.

In this book the reader will find an interesting treatment of drawing and blueprint reading—both architectural and mechanical. It is planned for use by beginning students, and should serve as an excellent text.

The material is arranged in 11 units, and with each unit a number of problems are suggested. The blueprint-reading section has four units—one for woodworkers, one for metalworkers, one for electricians, and one dealing with architectural work. In addition to these there are units on lettering, dimensioning, graphs, and charts.

Shriver L. Coover is Director of Industrial-arts Teacher Education at State Teachers College, California, Pa.

Composing In Space. Wiggin. Bloomington, Ill.: McKnight & McKnight Publishing Co., 1954. Pp. 48. $1.00.

This book has been written for the purpose of aiding students in the fine and industrial arts to develop an understanding of the importance of space relationship in design. The presentation is quite abstract, but the serious student will find many valuable suggestions in it.

Dr. Richard G. Wiggin is Assistant State Supervisor of Art Education in the State of Virginia.

General Electricity. Jones. Bloomington, Ill.: McKnight & McKnight Publishing Co., 1954. Pp. 120. $1.25.

This book should serve as an excellent text for beginners in the field of electricity. It is arranged in 23 individual units, covering such subjects as magnets, fuses, voltage, storage batteries, and circuits. Each unit contains appropriate text material, additional references, and a number of thought-provoking questions, thus lending itself to use as a class text.

E. W. Jones is Emeritus Associate Professor of Physical Science at Kansas State Teachers College, Pittsburg, Kansas.

Contemporary Furniture. Bick. Milwaukee, Wis.: Bruce Publishing Co., 1954. Pp. vi + 89. $2.75.

This book contains 93 projects, both large and small, and is designed for use by shop teachers, occupational therapists, and home craftsmen. These projects are well illustrated, and special techniques are explained step-by-step.

The designs presented begin with elementary work, and proceed to those that are more difficult. Each project is set forth in a well-organized fashion, under the headings of material, stock sizes, finish, and detailed procedure. Those interested in producing furniture of modern design will find the book helpful in many ways.

A. F. Bick has been an industrial designer for many years, and has written a number of books in the industrial-arts field.

Basic Concepts in Vocational Guidance. Sanderson. New York: McGraw-Hill Book Co., 1954. Pp. xiii + 338. $4.50.

This text is designed to help those concerned with counseling to familiarize themselves with the fundamental principles in educational and vocational counseling.

It contains a discussion of the psychological forces that prompt advisees to seek vocational help. The difficulties encountered by those who are engaged in counseling are explored, and the book includes an extensive discussion of the techniques used in social case work, as they apply to the process of counseling.

Herbert Sanderson is a member of the staff of the University of Buffalo.

The Art of Wood Turning. Klenke. Peoria, Ill.: Chas. A. Bennett Co., 1954. Pp. 186. $3.85.

This book contains photographs and plans for 70 projects. Some of these are suitable for beginners while others are difficult enough to challenge more expert craftsmen. It is filled with information about the use of the lathe as well as data on tools, equipment, methods of turning, and finishing.

William W. Klenke is a recognized authority in the field of industrial arts. He is also a master craftsman, and is now acting as a consultant to a large New Jersey firm.

Diesel Locomotives. Draney. Chicago: American Technical Society, 1954. Pp. vi + 344. $4.85.

This volume contains an up-to-date discussion of the various vital parts of the modern diesel engine. Each part is illustrated and described in nontechnical language, making the book suitable for the training of apprentices. In addition, it should serve as a handy reference for anyone interested in the construction, operation, or maintenance of engines of this type.

The publication of this book is quite timely in view of the definite shift being made from steam to diesel power on our American railroads.

John Draney is Past President of the United Association of Railroad Veterans.

Welding Alcoa Aluminum. Pittsburgh, Pa.: Aluminum Company of America, 1954. Pp. 176.

The latest developments in the welding of

aluminum are described in this book. Photographs and drawings are coupled with the text to illustrate the practical methods suggested by the company, with special attention being given to the selection of the method most appropriate for each type of job.

In the introductory chapter, the characteristics of welded joints are discussed. The remaining chapters are devoted to descriptions of the several methods recommended. In the final section, numerous tables are provided covering the physical properties of Alcoa alloys, the composition of these alloys, and the strengths of certain types of welds.

While the book is obviously intended for use in industry, it contains a vast amount of information that should be of interest to shop teachers who offer instruction in welding.

Metals Technology. Bornemann and Williams. Cleveland: American Society for Metals, 1954. Pp. viii+ 109. $3.00.

This book was compiled to fill the need for a text that could be used by technical high-school teachers whose students might benefit from an understanding of the fundamentals of metals and their uses.

In addition to the 22 pages of text material dealing with the various characteristics of different metals, there are 24 laboratory exercises from which the teacher may select those that fit into his teaching plan, and into the time available for laboratory work. These exercises involve hardness testing, tempering, spark testing, and identification of metals by spot testing.

Alfred Bornemann is associated with Stevens Institute of Technology. Robert S. Williams is professor emeritus at the Massachusetts Institute of Technology.

All About House Wiring. Mix and Pritchard. Chicago: Goodheart-Wilcox Co., 1954. Pp. 176. $2.50.

This book contains all of the information needed to install electric wiring capable of serving safely all electrical equipment used in the home. Procedures are well illustrated and they are described clearly in language that a layman can understand.

Floyd Mix is president of the Goodheart-Wilcox Company. E. C. Pritchard is head of the electrical department, Lane Technical High School, Chicago, Illinois.

Pamphlets:

Modern Shop Organization for Industrial-Arts Classes deals with the organization of an industrial-arts shop with a general superintendent and foreman, toolroom supervisor, stockroom foreman, and safety engineer showing the various duties and responsibilities. There is also a chapter on safety in the school shop. The booklet may be obtained for $.75 from Can-Pro Corp., 19-23-31 East McWilliams St., Fond du Lac, Wis., or it is distributed free with orders for aprons.

Let's Sand to Get Results—Not to Make Sawdust is published by Syncro Corp. and is free on request. The pamphlet describes proper sanding techniques, abrasives to be used, wood finishing, etc. Write the Syncro Corp., Oxford, Michigan, mentioning SCHOOL SHOP if you wish a copy.

Project Book No. 1 is a new booklet published by Reynolds Metals Co. showing 132 different projects made from "Do-It-Yourself" Aluminum. Copies will soon be on display in hardware stores, lumber yards, building-supply outlets, and all other Reynolds dealers or may be obtained direct from Reynolds Metals Co., 2500 South Third St., Louisville, Ky. Price is $.50.

Audio-Visuals:

ABC of Jet Propulsion, produced by General Motors, is an 18-minute color film explaining the basic principles of jet engines, gas turbines, and rockets. The movie ends with an explanation of why man's first flight to the moon will have to be in one type of jet—a rocket. The film may be obtained through the GM Public Relations Department, Detroit, Mich.

Aluminum on the Skyline, a story of the first aluminum skyscraper, the 30-story Alcoa Building in Pittsburgh, is a documentary picture showing design and construction of the building. The 16-mm sound movie was filmed over a three-year period. Prints may be obtained by writing Alcoa's Motion Picture Department, 722 Alcoa Building, Pittsburgh 19, Pa.

Pix-O-Fix TV Troublefinder Guide is a professional servicing guide to identification of the causes, location, and repair of everyday TV receiver troubles by the popular picture-analysis method. The guide costs $1 and is available from Rinehart Books, Inc., 232 Madison Ave., New York 16, N.Y.

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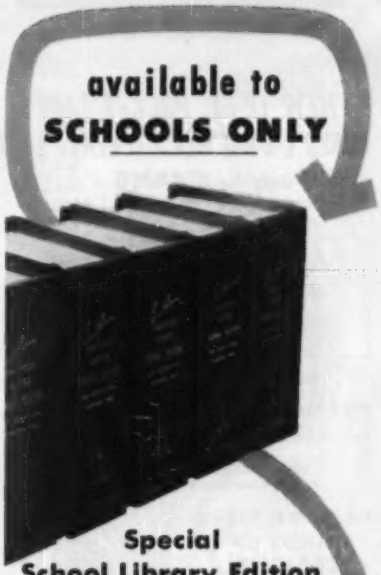

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San Francisco AVA Convention Preview

THE 48th annual American Vocational Association convention will be held this year in San Francisco, Calif. from Dec. 2-7.

Various affiliated organizations will hold their meetings preceding the regular sessions of the convention. Groups of administrators, teacher-trainers, and others will attend these meetings.

The convention, as usual will consist of general sessions and meetings devoted to the various divisions of the AVA. Lynn C. Monroe, of the University of California, Santa Barbara College, is program chairman for the industrial-arts division program and Charles W. Patrick, director of vocational education, San Diego, is program chairman for the trade and industrial-education division.

Among the industrial-arts sessions will be one devoted to the use and general operation of educational television in the field. The facilities of a television station have been arranged for part of the program.

On Saturday a full afternoon of demonstrations will include crafts, graphic arts, woodworking, electricity, and oil conservation.

A curriculum section for elementary education and the college level also will be presented with particular emphasis on what phases can be recommended as requirements for undergraduate and graduate levels.

The research group in industrial arts will hold a session on the topic "What Is New in the Field of Industrial Arts" with recent research studies being presented.

In the trade and industrial education sessions, Friday has been designated as Apprenticeship Day. The general session that night will climax with an apprentice graduation. Participating in the afternoon apprenticeship program will be many of the national coordinators of apprenticeship in the various trade fields, as well as national and local lay leaders and government officials. George Rosecrans, California supervisor of apprenticeship, is in charge of this program.

The general meeting of the Trade and Industrial-Education Section on Saturday will be concerned with "Management and Labor's Interest in Vocational Education" with a top national leader from labor and an official from a national management association taking part.

The women's section will deal with problems in trade and industrial education for women with another session on the training of practical nurses.

Other session meetings for trade and industrial-education teachers will include meetings on "Recent Trends in Supervisory Training," "Vocational Education in Correctional Institutions," and "Graphic Arts Education."

On Sunday afternoon a series of meetings will be held for teachers in specific trade fields, including automotive training and radio, television, and electronics training.

A combined meeting of the industrial-arts delegates and the trade and vocational-education delegates has been planned for Monday. This joint meeting will feature a discussion of the functions of industrial education in the total framework of education by Howard Campion, assistant superintendent of schools for Los Angeles, H. L. Shibler, superintendent of schools at Indianapolis, Ind., and Walter R. Williams, state director at Gainesville, Fla. ★

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Tree Stand . . . . . *from page 34*

mixture too wet. If the mixture is too wet, the pipe will settle to the bottom and the opening will project through the stand.

Pour the casting, pouring an inch or more concrete before placing the pipe in the form. Then place the pipe in the center, top side up and pour almost full. As the form is filled, spade with a trowel, or tamp carefully. Slip the insert form over the pipe, flat side up as shown in Fig. 2 in the illustration and work it down into the mixture by rotating it. When level with the top of the form, smooth off the excess concrete, and allow to set about one hour before removing the insert piece. The rest of the form should not be removed for 24 hours or more.

Smooth the concrete by rubbing with a piece of emery stone when thoroughly dry, then paint with a good waterproof paint or enamel. White or colored creosote paint will do for this paint job, but concrete paints can be used. The inside of the pipe can be coated with a mixture of linseed oil and dryer.

It is a good idea to make the stands in advance of the Christmas season so they will be completely dry before they are used. ★

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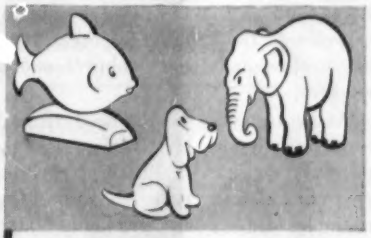

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Washington . . . . *from page 48* far this year, but those who are backing them promise that the AFL will act on them "possibly at the 1955 convention."

Labor Wants More Coop Training.—Meanwhile, the "cooperative plan" for technical training has caught the fancy of organized labor. It is nothing new but it has received new significance because of its recent adoption by President Martin Durkin for the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry. Soviet Russia, apparently has also taken up the cooperative plan in earnest. Mr. Durkin believes the cooperative plan can be used to solve "three national pressing problems"; (1) help those gifted young people who are unable to pay for a post-high-school education; (2) train technicians in woefully short supply; and (3) get better labor-management relations. The cooperative plan is spreading, says President Durkin.

Basically, the cooperative plan is a combination of classroom work and practical industrial experience. Mr. Durkin wants it used first to help solve the critical shortage of engineers. He would like each trade union in the nation to pay the college tuition of at least two cooperative-plan students. If the scheme catches on, it may be used by unions to promote the training of other types of professional and subprofessional workers.

As an argument for the need of more cooperative plans, Mr. Durkin cites the progress that Soviet Russia is making in technical and trade education. One example: Russia will graduate 50,000 engineers next year, while the United States will graduate only about 19,000. Mr. Durkin says that Russia is tapping the "Reservoir of native intelligence" while we are neglecting it. Russia's technical advances, it should be added here, are very much on the minds of Washington officials. Secretary of Commerce Sinclair Weeks, for example, has been making speeches on the same theme: Russia is producing twice as many technicians as we are. We are lagging not only in the production of highly-trained professional personnel, but also in the number of supporting workers needed by industry, commerce, and agriculture.

As if to underscore these views, the U.S. State Department received reports that Soviet Russia has opened this September additional technical-training schools for its high-school graduates. Moscow, Leningrad, Kiev, and Odessa have opened six such centers during the past three months. The newspaper *Izvestia* reported that 250 similar schools exist in other Soviet towns and cities. They will prepare students to work in 77 trades. The courses will require only one year. Students will attend theoretical lectures and do practical work on alternate days for six months. The last six months will consist only of guided practical work. The schools will be affiliated with factories, collectivized farms, power stations, and research laboratories. The teaching staff will come from these enterprises. There will be no tuition, according to the information received by our State Department; in fact, students will receive an annual stipend.

Technological and Educational Advance.—Not that Washington is despairing of our industrial advances when comparing them to those of Russia. Indeed, no. Another Commerce Department official, Under-Secretary Walter Williams, has said:

"Great as has been our past industrial progress, it is relatively trivial as compared to the breath-taking, awesome extent of America's further progress which is to be. Atomic power will come faster than most people think. The processes for its production are moving forward swiftly. No longer is it necessary to develop atomic plants in remote spots for fear of explosion or radioactivity. They can and will be built where facilities exist: people, houses, schools, hospitals, streets, and water.

"Atomic power is not all. Electronics is another field of applied science where unbelievable developments are taking place. 'Automation'—automatic factories—are, in effect, already here."

Even greater progress, according to Mr. Williams, will depend on many things: vision, determined action of people, maintenance of our freedom. And on the ability of educators to convince the people that educational opportunities must be expanded.

Public Relations.—This is where public relations comes in. To some, public relations is "selling"; to others, it is "publicity"; to still others, it is "putting over" a big campaign for something the school people want.

To the American Vocational Association Committee on Research and Publications, it is "creating a harmony of understanding between the school and the community it serves and upon whose goodwill it depends. . . . Good public relations involve publicity and interpretation, but even more they involve good teaching, sound administration, and

genuine cooperation in planning and working for good schools, with the public giving and taking ideas . . . Handshaking, playing the good fellow, appeasing, cajoling, and indulging in 'double talk' are not to be mistaken for desirable and lasting forms of public relations."

These views are from the AVA's forthcoming booklet, *Public Relations For Vocational Educators*. Reading the advance pages of this document, one wonders why it was not prepared 10 or 20 years ago. Have vocational educators been so busy looking at themselves that they had no time to raise their eyes toward the people?

Gilbert G. Weaver, New York, who heads the group preparing the document, provides this breakdown of the forthcoming chapters:

The first section will describe the need to be public-relations conscious and the importance of good community relationships to the success of a vocational program. The next three sections will point to the many groups ("publics" is the preferred word these days) in the school and community which public relations should touch. Then will follow sections devoted to the technics and media for reaching the "publics." The concluding section will present case histories of public-relations programs carried out to meet problems in the operation of vocational education.

The Changing American Scene.—The Brookings Institution of Washington, an association of economists and social scientists, took a look into the future and made this prediction:

Change and innovation are in store for American trades and industries. There can be no settling down to established practices.

Robert D. Calkins, head of Brookings, put it this way:

"Wave after wave of technological innovation is in prospect for American shops, factories, stores and offices. Science and technology will make vast changes in our production and distribution machines."

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Cut-Away Engine *from page 14*

and mobile in the classroom situation. It has operated some 50 hours since completed without a mechanical failure and with only the normal servicing required of a gasoline engine.

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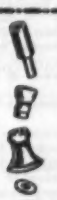

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By MICHAEL PACA

Course Yet Uncharted.—There is still more than a touch of indecision—even confusion—in the air at the U.S. Office of Education. Staff members are waiting for a guiding hand. But it hasn't yet made itself evident. Commissioner Sam Brownell, in great demand as a speaker, has had to devote more time to speechmaking than any other Commissioner in recent times. Further, he is occupied with answering questions to the Gwinn Committee investigating the Office of Education; with laying plans for the White House Conference on Education scheduled for 1955; and with providing to top Administration officials facts which they can use in explaining to the people during the political campaign what the Eisenhower Administration has done for education.

Reports persist that Dr. Brownell is planning the most drastic reorganization of the Office since its beginning—and that takes time to bring about. If reports are correct—and the Commissioner will not announce the plans until they are completed—all divisions dealing with specific functions will be abolished. In their place will arise three major divisions concerned with research, administration, and grants-in-aid. Thus, the existing vocational education division—and this is still speculation—would be split so that its research, administrative, and grants-in-aid activities are distributed among the new divisions dealing with these functions.

Meanwhile, staff members are waiting . . . waiting . . .

Labor Waits.—Waiting, too, is the American Federation of Labor. It appears that the AFL had asked the U.S. Office of Education some time ago to "revitalize" the advisory committee on vocational education and to create a committee on apprenticeship training.

Dr. Brownell had replied that he would appoint such committees "just as soon as he can properly ask their counsel or be in a position to follow through on the advice given." AFL officials noted at their convention in Los Angeles in September that these advisory committees had not yet been named by the government. Their grumbling persisted from Los Angeles to Washington, the AFL headquarters. They still would like to see the two advisory committees created. And they would like to see more of the kind of cooperation which took place last year when the Vocational Education Division explained for trade-union officials, through a detailed bulletin, what vocational education is and what it is not.

What really troubles organized labor about vocational education, however, reaches deep into the attitudes of local schoolmen and teachers rather than the attitudes of the federal education office. "It is the thinly veiled contempt in which manual labor and the manual worker are held by those educators who . . . proclaim their devotion to democratic ideals." The AFL believes that educational leaders help develop and maintain discriminatory practices against the children of wage-earning families. Trade union officials are still bitter against the IQ, or rather the abuses to which the IQ is put: "Pupils with a low IQ are put into vocational classes; those with a high IQ are 'guided' away from it." And the vocational courses themselves are not closely "integrated" with trade unionism, acording to the AFL.

To correct abuses and to eradicate faulty tendencies, some AFL officials have proposed a national conference on "Education and Training for Work" and possibly also a pictorial brochure explaining what labor has done to develop vocational education in this country. These suggestions did not get very

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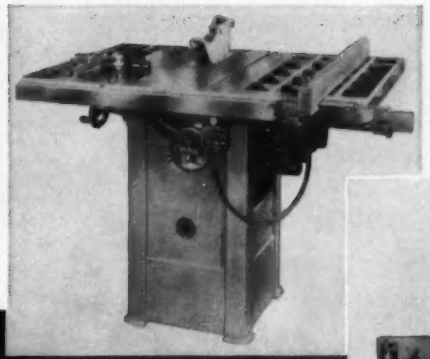

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